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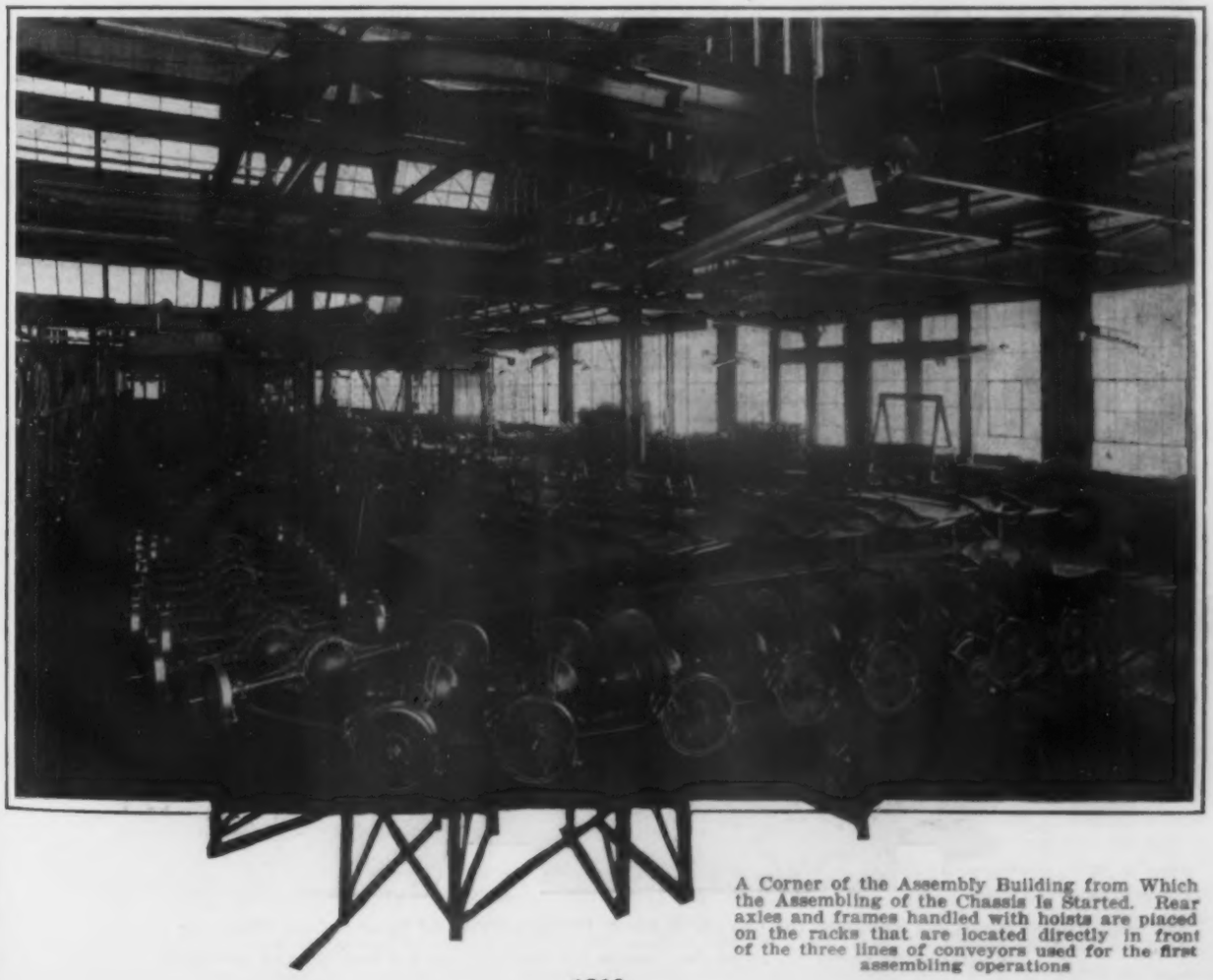
Motor Car Assembling at Hudson Plant

Parts Enter Separate Building Through Doors at Convenient Points and Are Assembled, Painted and Dried on Nine Parallel Conveyor Lines

PROGRESSIVE assembly of motor cars with some form of conveyer equipment for moving the car as it is being put together starting with the frame, is standard practice with practically all automobile companies that operate on a production basis, but the arrangement and equipment of assembly departments are being improved with equipment of new departments for assembling with a view to reducing costs, increasing speed and conserving floor space.

A late addition to final assembly plants in the automobile field, having new features, is one recently built by the Hudson Motor Co., Detroit, to provide for the rapid assembling of Essex cars.

The assembling is done in a one-story building, erected for that department and is entirely separate from the manufacturing departments. This building is 400 ft. long and 300 ft. wide of steel, brick and glass construction, with a saw tooth roof and concrete floor. Frames, motors, bodies and other parts are taken into the building through doors on whatever side is convenient to the point where they are wanted for the assembly lines. There are three duplicate conveyor lines side by side for assembling, painting and drying, and all the operations require three sets of lines, making nine parallel lines on one side of the assembly building. The first line is used for chassis assembling and for the first or



A Corner of the Assembly Building from Which the Assembling of the Chassis Is Started. Rear axles and frames handled with hoists are placed on the racks that are located directly in front of the three lines of conveyors used for the first assembling operations

priming coat of paint. The first set of conveyors are 360 ft. long, 205 ft. being used for assembly and painting, the conveyor passing over the remaining distance through an oven for drying the paint.

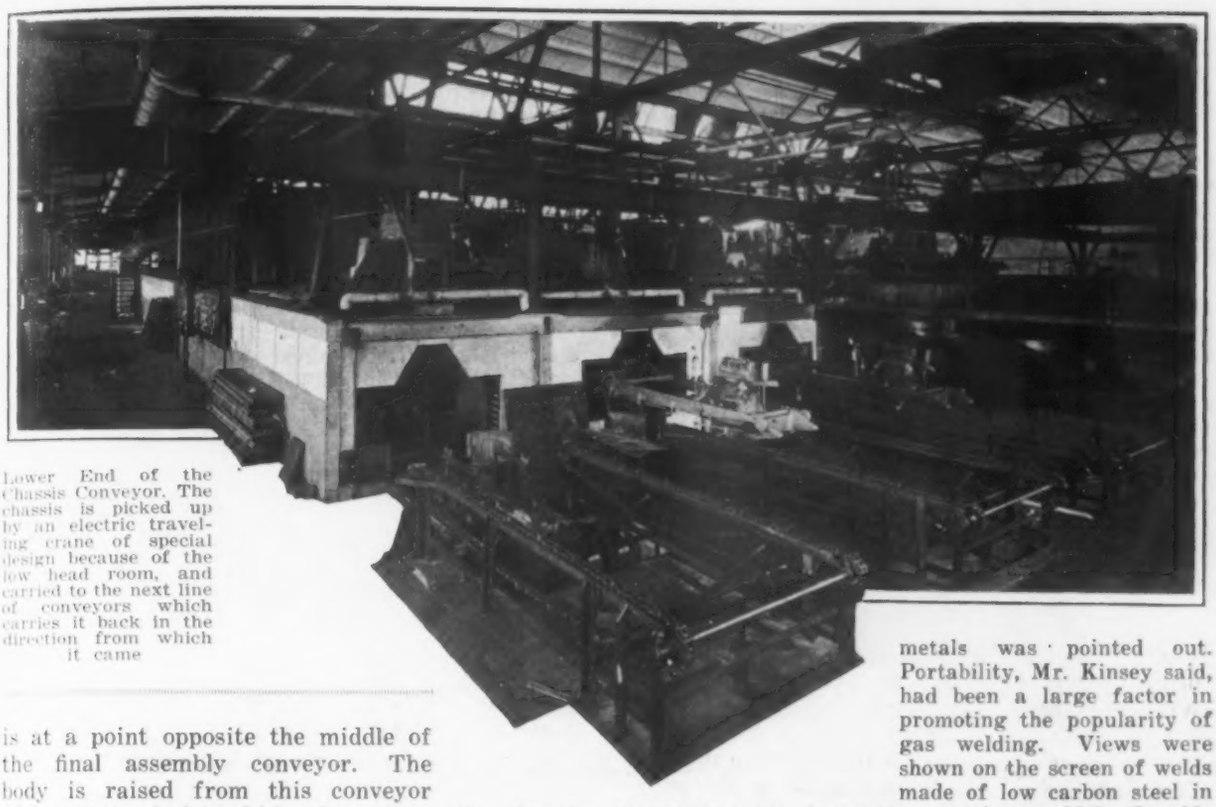
The frames and rear axles are taken into the building near the front end of the conveyors and are placed on racks in front of the conveyors, being handled by Yale hoists before reaching the conveyor lines. This conveyor consists of two endless chains moving just above the floor. Between the chain, a four-wheel steel truck 30 in. high is carried, the front wheels of the truck being attached to the conveyor and the truck running in a track that extends inside of the conveyor chain. On reaching the end of the line, the truck with the conveyor passes through a tunnel under the floor and back to the starting point. The automobile frame rests lengthwise on the truck during the operations, its first position being upside down. The trucks are spaced at sufficient distance and the lines far enough apart to permit assemblers to work on all sides of the chassis. Part way down the line, an air hoist picks up the frame and turns it over. Just beyond this point a ½-ton Shephard electric hoist brings the motors from one side to the conveyor. With the chassis completely assembled, the first coat of paint is applied by spraying on the frame. The excess spray of paint is thrown from the frame by a suction fan, carried to a spraying pit and discharged outside of the building. After spraying, the chassis passes into an asbestos lined oven which is heated to a temperature of 170 to 180 deg. Recording thermometers are connected to the ovens. It takes 45 min. for the chassis to pass through the oven and during that time the paint is dried.

At the end of the first line of conveyors the chassis pass upon an unloading frame truck from which they are picked up by Shephard electric traveling cranes, of special design to meet conditions required by the low head room. The roof truss is but 14 ft. high, and the crane runway 12 ft. above the floor and there is a space of only 20 in. from the truss to the crane hook. This crane which has a 35-ft. span and runs across the end of the building transverse to the conveyor, carries the chassis to the next three rows of conveyors, 365 ft. long, which are located on a platform 8 ft. above the floor and supported by a steel frame construction. Space under this conveyor balcony is used as a stock room for parts, metal racks being provided for small parts.

On being placed on the second line of conveyors, the chassis moves back in the opposite direction from which it was conveyed on the first line. This conveyor consists of two chains that slide on steel channels. On this conveyor the chassis is given its second spray coat of paint after which it passes into a second oven about one half the length of the conveyor, taking 1½ hr. to pass through this oven. After leaving the oven, the chassis is cooled by air forced over it and through ducts beneath. After the cooling, the wheels are assembled to the chassis and the latter is picked up by a 1-ton crane and started back in the opposite direction on the final assembly line, the wheels resting on a chain conveyor. Between the second and third sets of conveyors a wheel painting balcony is provided, wheels being placed opposite the point at which they go on the cars and being delivered by gravity rollers.

Running at right angles to the other lines of conveyors, are two body assembling conveyors. Bodies are placed on these conveyors by an air hoist, being set on trucks attached to the conveyor chain. This truck after the body is removed, returns to the opposite end of the line through a tunnel underneath the floor as in the chassis assembly conveyor. While the body is moving along this conveyor, the parts are assembled to the body and when the latter reaches the end of the line, it

The Two Sets of Conveyors on Which the Chassis Is Given Its Second Coat of Paint and on Which the Wheels Are Assembled. These conveyors are located on a platform above the assembling room floor providing space beneath for the storage of parts. This shows the crane that carries the chasses from the first lines of conveyors



Lower End of the Chassis Conveyor. The chassis is picked up by an electric traveling crane of special design because of the low head room, and carried to the next line of conveyors which carries it back in the direction from which it came

is at a point opposite the middle of the final assembly conveyor. The body is raised from this conveyor with a 1-ton hoist which places it on the chassis on the opposite conveyor. After the body is connected to the chassis, the car leaves the assembly line and moves to the filling dock and after being supplied with gas and oil, is ready to run under its own power.

The speed of the conveyors is 33 in. per min. and 6½ hr. after the frame is placed on the chassis assembly line, the completed car rolls off the final assembly line.

Welding Processes Discussed

The principles of arc, gas and thermit welding were presented at a session of the Metropolitan Section of the American Society of Mechanical Engineers, held in conjunction with the American Welding Society and the four metropolitan student branches of the society in the Engineering Societies Building, New York, April 13. Prof. Comfort Adams, president of the American Welding Society, in introducing the speakers, explained that the fields covered by the three welding processes to be discussed were becoming more clearly defined and the boundary lines more closely drawn as the art progressed, and that there were applications best served by each of the processes now clearly recognized.

The relation in arc welding of the size of electrode, material of electrode, length of arc, method of holding the parts in position, and welding technique were explained by O. A. Kenyon, engineer, Ray D. Lillibridge, Inc., New York. The applications and the proper methods of making single line, double line and rivet welds were pointed out. Most of the troubles encountered in arc welding, Mr. Kenyon said, were due to nonuniformity in the mechanical structure of the electrodes; flaws of various natures such as cracks, pipes, entrained gas, etc., being the primary causes of trouble. There probably has been more advancement in the art in the last two years, he said, than in the previous ten years.

The history of the developments of gas welding and characteristics peculiar to the ox-acetylene weld were discussed by A. S. Kinsey, supervising instructor of shop practice, Stevens Institute of Technology, Hoboken. Welds of 100 per cent strength, he said, can be made by using a welding rod of greater strength than that of the material being welded. The adaptability of the process to welding the non-ferrous as well as the ferrous metals was pointed out. Portability, Mr. Kinsey said, had been a large factor in promoting the popularity of gas welding. Views were shown on the screen of welds made of low carbon steel in the fire box of a locomotive, cast-iron weld in the side frame of a car, pipe, welding, etc.

The process of thermit welding and its applications were presented by J. H. Deppeler, chief engineer Metal & Thermit Corporation, New York. The details of construction and operation of the crucible in which the aluminum and iron oxide reaction takes place were explained in detail. The temperature attained, the speaker said, requires a crucible of very high refractory material. Lantern slides showed how the sections to be welded were cut out, the wax put in place, and arrangements of the crucibles; also steps in the welding of crank shafts, large metal shear, steel rails, pipe, cast-iron frames of large punches, etc.

Screw Machine vs. Turret Lathe

The Warner & Swasey Co., Cleveland, announces a campaign for discontinuing the name "screw machine" when applied to the modern turret lathe. It is explained that the name "screw machine" is no longer appropriate when applied to the modern turret lathe, which is now seldom used for the making of screws, as automatic screw machines of various types serve this purpose better when large quantities are involved. Ten years ago bar work was the main product handled on what was then known as a hand screw machine; but to-day there is more chucking work performed on the turret lathe than bar work. Furthermore, the modern turret lathe is designed and constructed to handle heavy castings and forgings and is provided with sufficient power for machining tough forgings and alloy steel parts. For use merely for making screws, the present power provided in turret lathes would be superfluous.

The Warner & Swasey Co. is urging all users and manufacturers to aid in the campaign for dropping the old term "screw machine" when applied to turret lathes.

The Youngstown Foundry & Machine Co., W. J. Wallis, president, is planning to commence work on a new roll foundry at Girard, Trumbull County, where it owns a 12-acre site along the Erie right-of-way. The Erie is completing a siding into the property and material for the roll foundry will start to arrive within the next month. The company operates two foundries in Youngstown, which will be abandoned when the new plant is completed. By combining both foundries into one works, the company expects to effect a substantial economy in overhead and operating expense.

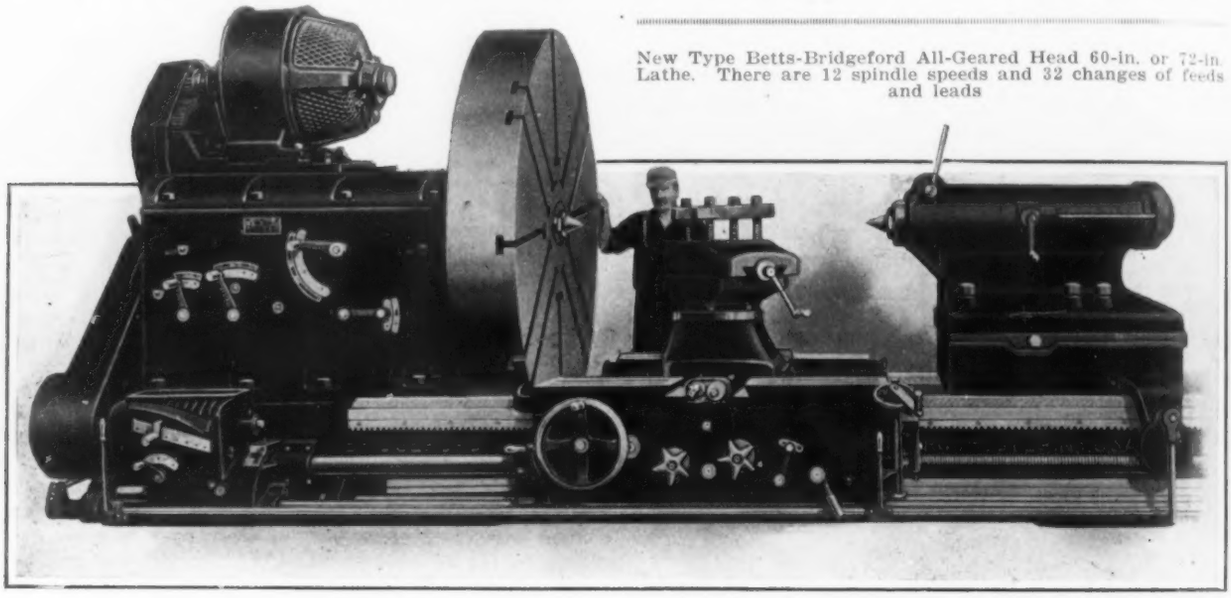
Geared Head 60-In. or 72-In. Lathe

A new type of all geared head lathe to swing 60 in. and 72 in. has been designed by the Betts Machine Co., Rochester, New York.

The head stock is of the all geared inclosed type, and is driven through an expanding ring friction clutch which is operated from the apron, a position convenient to the operator. The same movement which disengages the clutch automatically applies the friction brake, thereby to stop the machine almost instantly.

There are 12 spindle speeds in geometric progression controlled by conveniently located levers at the front of the head stock. All speeds are through internal face plate gear and pinion.

All speed changes are obtained through hardened steel sliding gears and positive clutches running in oil and having edges of gear teeth rounded to allow for speed and ease in engagement. No two speeds can be engaged at the same time. All shafts and gears are located in the lower half or base of the head stock and



New Type Betts-Bridgeford All-Geared Head 60-in. or 72-in. Lathe. There are 12 spindle speeds and 32 changes of feeds and leads

are thus made readily accessible when the cover is removed. All shaft bearings are bronze bushed and all bearings are lubricated by chain oilers. When motor driven, the motor is mounted on top of the head stock cover and direct connected through gearing to the main driving shaft.

There are 32 changes of feeds and leads obtainable through quadrant gearing and quick change gear box to lead screw. Feeds are driven from a spline in the lead screw to the rack on the bed through all steel gearing and large frictions. No two feeds can be engaged at the same time. Feeds and leads are interlocking, so that only one can be in use at one time.

The apron is of the double wall unit casting construction, there being no overhanging studs. All shafts have a bearing on each side with gearing running in oil. The power angular feed to the compound is driven from cross feed friction, a slip gear being provided for cross feeding or power angular feed, and are reversed at the apron. Both feeds and leads may also be reversed at the head stock. Power rapid traverse is obtained by a friction clutch on the lower shaft in a quick change box which is driven from the constant speed head stock driving shaft by Morse silent chain at the head end of the lathe. Rapid traverse is operated by a lever at the apron. The movement which engages the rapid traverse clutch automatically first disengages the feed and lead making it impossible to have both engaged at the same time. The rapid traverse is applicable to longitudinal cross or power angular feed.

The firm of Hogan & Donnelly, Philadelphia, iron and steel, bolts and nuts, supplies and equipment, has been dissolved as of April 1. The business will be hereafter conducted by Michael Donnelly, trading under the name of Donnelly & Co.

Senate Will Investigate Housing Conditions

WASHINGTON, April 20.—The Senate has adopted a resolution offered by Senator Calder, of New York, providing for an investigation of the housing situation. It is proposed that a committee of five Senators shall be authorized to conduct an inquiry extending over a wide scope. The committee is authorized "to inquire into the existing situation in relation to the general construction of houses, manufacturing establishments, and buildings, and the effect thereof upon other industries and upon the public welfare, and to recommend such measures as may be deemed necessary to stimulate and encourage such construction work, to encourage popular investment rather than spending, to foster private initiative in building, and to insure cooperation between labor and persons or corporations engaged in transportation, banking and other business necessary to the development of such construction." The committee, which is to be appointed by the president of the Senate, is to consist of three Republicans and two Democrats. It is instructed to report to the Senate on or before Dec. 1.

In stating his purpose in presenting the resolution Senator Calder said that there is to-day a shortage of building material of every character, a shortage of railroad facilities to transport building material, a shortage of fuel necessary for the manufacture of building material, and a great need of additional labor for the construction of buildings. Senator Calder, who himself has had many years' experience in the construction business, said that although some building investments are attractive, there is a great shortage of money to finance building operations. He said that men of great wealth who formerly invested some part of their means in mortgages on real estate are rapidly calling in these mortgages, the reason being that the high income and excess-profits taxes on large incomes have reduced the net income on these investments to the neighborhod of 2 per cent, so that much money that formerly went into mortgages is now being invested in State and county bonds, which are exempt from all Federal taxes.

Senator Calder said his personal experience showed that its costs 75 per cent more to build a house than last year, and 150 per cent more than in pre-war times.

Electrical equipment in industrial plants is the subject of No. 29 of a series of bulletins entitled Safe Practices, published by the National Safety Council, 168 North Michigan Avenue, Chicago. The pamphlet discusses dangers of shock, burns, flashed eyes and mechanical injuries from electrical utilization equipment carrying less than 750 volts, and located so that it is accessible to other than qualified electrical operators.

Evolution of the Electric Brass Furnace*

Electric Crucibles—Overhead Resistor and Induction Principles—Arc Type Units Using Mechanical Agitation—Advantages of Electric Melting

BY H. M. ST. JOHN

AN electric furnace classification is based, as a rule, on the difference of method utilized for the application of heat to the material under treatment. In this case the species are three:

The induction or direct resistance furnace, in which heat is generated in the metal itself by virtue of its own resistance to the passage of an electric current.

The arc furnace, in which heat is generated between an electrode and the metal, or between independent electrodes, and transferred to the metal by conduction or radiation, direct or indirect.

The indirect resistance furnace, in which heat is transferred from an incandescent resistor to the metal by conduction or radiation, somewhat as in the arc furnace.

All of the electric furnaces so far proposed for melting brass naturally fall in one of these classes, or a combination of some two of them.

Electric Crucible Furnaces.

In the beginning the would-be inventor of an electric brass-melting furnace was obsessed by the idea that such a furnace should bear a close resemblance to the combustion furnaces then in use for that purpose. In the electric crucible furnace, as in the fuel-fired crucible furnace, the heat must, in general, be generated at some point outside the crucible and transmitted to the metal through its walls. A favorite suggestion was to surround the crucible with an electric resistor of granular nature, which was heated to incandescence by the passage through it of a suitable electric current.

Most of these fundamental difficulties were obviated by using a resistor which surrounded the crucible but did not come in contact with it. In this way the heat generated in the resistor was first transmitted to the crucible by radiation, and, finally, by conduction through the walls of the crucible to the metal.

To the writer's knowledge, the only furnace of this type which was ever operated with any degree of technical success was equipped with wall resistors of thin carbon slabs, provided with means of variably adjusting the contact pressure between the slabs. The generation of heat in this furnace depended, not on the resistance of the carbon itself, but on the contact resistance between the slabs, which could be varied at will in such a way as to provide an excellent means of controlling the current and voltage, and thus the rate of power input. Despite its good qualities, it was soon apparent that this furnace could never be commercially successful. Its maintenance cost, both for carbon electrical parts and refractories, was a serious handicap, but more serious still was the fact that its thermal efficiency was inherently and irremediably low.

The latest proposal to melt brass in an electric crucible is one which has recently been very thoroughly described and discussed, in which the metal within the crucible is heated by a high-tension, high-frequency induction or eddy current. The walls of the crucible itself are electrically conducting and serve to heat its contents during the period while the metal is still solid and in pieces not in good electrical contact with each other. Most of the disadvantages already described as characteristic of the crucible furnace have been overcome in this design. This new type has, however, so far been built in sizes more suitable for the laboratory than the foundry.

The low thermal efficiency of crucible furnaces heated from without naturally suggested the possibility of utilizing the walls of the crucible itself as a resistor. This principle was tried out quite thoroughly rather early in the development of electric furnaces for melting brass. In one type the crucible was built of a special mixture with suitable electrical conductivity but no attempt was made to insulate the walls of the crucible from the metal which it contained. In another design this feature was taken care of by means of a special insulating lining separating the conducting walls from the metal. It proved almost impossible, however, to maintain this insulating layer, and short circuits invariably resulted.

Overhead Resistor Furnaces.

Not all, even of the early experimenters, limited their attention to the crucible furnace. The advantages of a larger furnace capacity and the elimination of crucibles were sufficiently obvious, and had already resulted in a considerable use of various types of direct-flame oil and gas furnaces. The earliest attempts to melt brass electrically in a furnace of this sort made use of an incandescent resistor supported above the bath and radiating heat directly to the metal. This construction, applied to an open-hearth furnace of small capacity, gave rapid melting and a fairly high thermal efficiency. The principal difficulties were two: the development of a resistor which would stand up continuously under the required conditions without an excessive maintenance cost, and the invention of some reliable method for supporting the resistor in the desired position over the bath. Neither of these basic problems has ever been adequately solved.

The difficulties which interfere with the use of an overhead resistor are partially avoided if the resistor is located above the bath, but at either side or surrounding the central portion of the melting chamber. One well-known type of furnace now in commercial use employs this principle, utilizing for the purpose a granular resistor contained in a nearly circular refractory trough. This trough is exposed to very severe usage since the resistor temperature must be much above that of the molten metal. The roof also is at a temperature considerably in excess of that of the metal and must be highly refractory. Another type of furnace which is in somewhat limited commercial use employs a combination of granular resistor and smothered arcs at either end of the melting chamber. In this type also most of the heat must first be radiated to the roof and then to the metal.

The Induction Principle.

A high thermal efficiency was early recognized by several of the more far-seeing investigators in this field as an absolutely essential qualification for the permanently successful electric brass melting furnace. It seemed obvious that if some practical method could be devised for generating heat in the metal itself, conditions most favorable for a high efficiency would be produced. The celebrated pinch-effect phenomenon is too well known and has been too often discussed to require definition here. The pinch-effect can be utilized to increase substantially the electrical resistance of molten brass through which a heavy electric current is flowing. This was done with considerable success in designing the first practical direct-resistance furnace for brass. It has recently been proposed to change the construction of this furnace in such a way as to eliminate the massive metallic electrodes.

The elimination of electrodes from the design of the direct-resistance furnace was evidently of the high-

*From a paper presented at the annual spring meeting of the American Electrochemical Society at Boston, April 10. The author is sales engineer, Detroit Electric Furnace Co., Detroit.

est importance. This was done in a somewhat later type of furnace by constructing it as a vertical-ring induction furnace with the resistor channels joined at the bottom to form a complete circuit for the passage of electric current. The limitations of the vertical-ring induction furnace are due, first of all, to the fact that it is an induction furnace and, as such, cannot be constructed in large sizes without introducing electrical disadvantages such as low power factor.

Furnaces of the Arc Type.

The widespread success of arc furnaces in the melting of steel was not overlooked by those more particularly interested in the brass industry. Many attempts were made to apply both direct and indirect arc furnaces directly to the melting of brass, without changing the design which had been found most suitable for steel melting. These attempts were pretty uniformly unsuccessful, because copper and its alloys —particularly the high-zinc alloys—suffered under the direct application of such a high temperature heat source as the electric arc.

A great deal of study was devoted to the discovery of some method which would make possible the utilization of the good features of the electric arc for brass melting. The direct type of arc furnace was evidently out of the question. In the indirect arc furnace, overheating was less localized. It seemed probable that if the metal could be stirred with sufficient vigor, the entire bath could be maintained at a uniform temperature, and tendency toward local overheating could be entirely neutralized. It was found by experiment that rocking the furnace mechanically, at the rate of approximately two oscillations per minute, resulted in a degree of agitation ample to maintain complete uniformity of temperature throughout the molten bath, and that the obvious advantages of the arc furnace could be utilized in this way without the slightest injury to the metal, even in the case of alloys containing 40 per cent or more of zinc.

The so-called rocking electric furnace resulted from this development and is in wide commercial use at the present time for melting all classes of copper alloys, as well as copper itself. As in the induction furnace, the vigorous stirring of the metal results in a uniformity of temperature and of composition throughout the alloy, a feature which is of particular importance in the melting of high-lead alloys.

The pronounced success of the rocking type of arc furnace has prompted many suggestions for modified designs, similar to it in principle but differing from it in details of construction. For example, it has been proposed to rotate the furnace body instead of merely oscillating it.

The evolution of the electric brass furnace has now proceeded to such a point that fundamental improvements in design are henceforth likely to be rather slow to materialize. There will, of course, be constant progress in the development of refinements in mechanical and electrical design, calculated to make the furnaces more reliable, more durable, and more nearly fool-proof than they are at present.

Advantages of Electric Melting

This brings us to a brief consideration of what the brass foundryman can expect and ought to realize from the use of electric furnaces.

The first and probably the most important point is the saving of metal—commonly wasted during the melting process—which electric melting makes possible. If the charge to be melted consists of new metal or clean scrap, the net metallic loss during melting and pouring from the furnace should not exceed one per cent for yellow brass and 0.5 per cent with red brass. With clean yellow brass, containing 40 per cent of zinc, losses as low as 0.75 to 0.85 per cent have been experienced as an average for a considerable tonnage of metal melted. In melting a scrap charge containing a high percentage of non-metallic, such as oily borings, chips, grindings, etc., the net loss should not exceed two per cent.

It is also true that the furnace which melts without agitation is not particularly well suited for melting a charge which contains a high percentage of finely divided, dirty scrap, while these can be handled without difficulty in either induction or rocking arc furnaces. Brass melted in the electric furnace is practically free from metallic-oxide drosses and has no opportunity to pick up sulphur or other contamination from combustion gases.

The consumption of electric energy under average conditions of 8 to 10-hr. operation is as low as 240 kw. hr. per net ton for yellow brass, and 275 kw. hr. per ton for red brass, in the induction or arc furnaces. In 24-hr. operation figures as low as 200 kw. hr. per ton or less, have been obtained. Less efficient furnace types use from 400 to 500 kw. hr. per ton, depending upon conditions.

Flexibility, which in this case may be defined as the suitability of a furnace for radical changes in operating conditions or for an abrupt change in the composition of the alloy to be melted, is a marked characteristic of the resistance and rocking arc furnaces, which is notably lacking in the induction furnace.

The net melting cost, considering all factors which should properly be considered under this head, is naturally lower in those furnace types which melt the metal most rapidly and efficiently, since their use of electric energy is more economical and their higher rate of production reduces the fixed charges per ton of metal melted. In many cases, the cost of electric melting is not more than half the cost of melting the same alloy in combustion furnaces. Even in the less efficient furnace types, electric melting is usually less costly than the older methods.

Electric brass melting can no longer properly be called "the coming thing." It has arrived in a most convincing fashion, as is evidenced by its rapid adoption by the larger and more progressive rolling mills, foundries, and manufacturing establishments which use brass in large quantities.

The Carelessness Factor

WASHINGTON, April 20.—The Bureau of Labor Statistics has issued a revised bulletin on accidents and accident prevention in machine building. This takes the place of the previous bulletin issued in 1917. The latter contained statistics covering the period to 1913, while the new issue uses figures covering 1917 and a part of 1918.

It also includes an interesting chapter on the influence of the war on accident rates in machine building. This is based on the statistics obtained from 100 establishments of the 194 which contributed statistics to the previous bulletin. The remaining 94 firms declined to submit the desired information, says the bulletin, on the ground of excessive pressure on their clerical forces. The figures reveal a general increase in the seriousness of accidents but a decline in their frequency. In the manufacture of machine tools, both frequency and severity increased—the frequency practically doubling and severity trebling. In the manufacture of electrical apparatus the frequency declined 65 per cent and the severity rate 21 per cent. Navy yards considered as a unit made a marked improvement in both frequency and severity, says the report. The accidents in private shipyards declined in frequency but increased in severity.

The bulletin contains an interesting comment on "human carelessness":

"Evidence is not wanting in the material considered in this brief review," says the bulletin, "that some of the engineers who share in the credit for this excellent showing are still too much impressed by the human factor and attribute too much to so-called 'carelessness.'

"Not until this idea is cast out of the mind of the men directly in charge will the engineers get down to the real fundamentals of accident prevention, namely, (1) adequate 'engineering revision' and (2) proper supervision of men and instruction in safe methods of doing work."

The bulletin just issued, "No. 256," is liberally illustrated. Copies may be procured from Superintendent of Documents, Government Printing Office, Washington.

Design of Open-Hearth Furnaces*

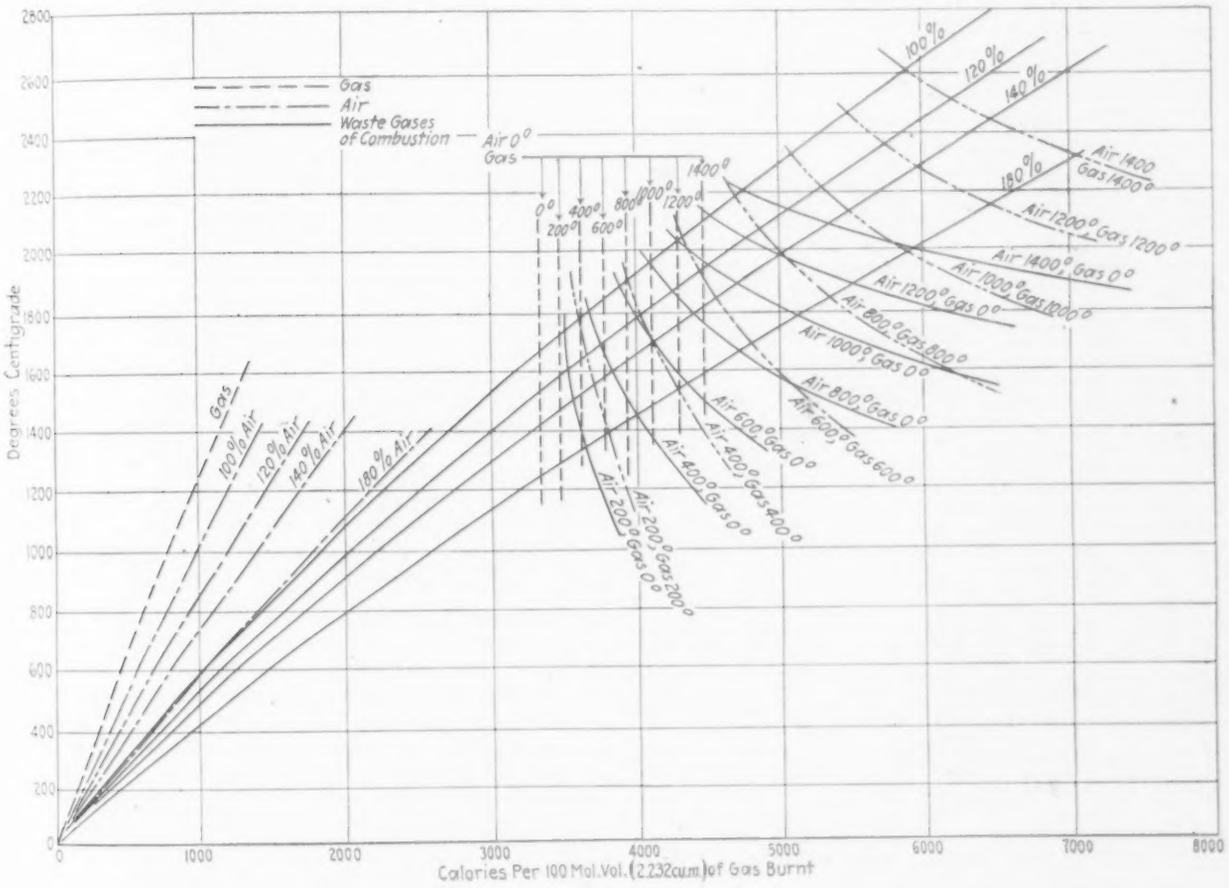
Calculating the Size of the Regenerators for a 50-ton Furnace Using Producer Gas

BY A. D. WILLIAMS

TAKING up the design computations for a 50-ton open-hearth furnace regenerator, the following assumptions are made:

Melting capacity of furnace	50 tons
Number of heats made per week	15
Average time per heat, charge to tap	8 hr. 20 min.
Coal consumption per ton of steel	300 kg. (660 lb.)
Average number of reversals per hour	3
Secondary air supply, per cent of theoretical	140

Total coal consumption = 300 × 50 = 15,000 kg. (for the 500 min.) The average coal consumption will be 30 kg. per minute, or 0.5 kg. per second. The maximum rate of coal consumption will be approximately 1.25 kg. per second. This coal gasified in a producer supplies 3.5 cu. m. of gas per kilogram of coal gasified and this gas, burned with 40 per cent excess air, requires 1.87 volumes of air per one volume of gas and the products of combustion will be 2.68 volumes. Fig. 20 shows the heat capacity and calorific intensity curves of the producer gas, the air supply and the waste gases, as computed according to the methods of Mallard and Le Chatelier. These curves are based



Heat Capacity Curves of Producer Gas, Various Air Supplies and Their Products of Combustion Together with Curves Indicating the Calorific Intensity as Affected by Various Degrees of Preheating of the Air, the Gas and of Both the Air and the Gas.

Gases of Combustion on Burning 100 Volumes of Haw Producer Gas

				Calories	O_2	CO_2	H_2O	N_2
H_2	11.26	× 58.2	=	655	5.63	....	11.26	22.52
CH_4	3.24	× 195.2	=	632	6.48	3.24	6.48	25.92
CO	29.65	× 68.2	=	2.022	14.83	29.65	....	59.32
O_2	0.19	...		....	....	....	....	....
CO_2	1.25	...		....	....	1.25	....	....
N_2	50.69	...		....	....	....	....	....
H_2O	3.72	...		....	....	....	3.72	....
	100.00			3,309	26.94	34.14	21.46	158.45
					0.19	....	....	0.76
					26.75	34.14	21.46	157.69

Combustion of 100 Molecular Volumes of Gas

Air Supply Per Cent	Air Molecular Volumes	Excess Air	O_2	CO_2	H_2O	Excess N_2	N_2	Total
			Products of Combustion in Molecular Volumes					
100	133.75	0.00	0.00	34.14	21.46	0.00	157.69	213.29
120	160.50	26.75	5.35	34.14	21.46	21.40	179.09	240.09
140	187.25	53.50	10.70	34.14	21.46	42.80	200.49	266.79
180	240.75	107.00	21.40	34.14	21.46	85.60	243.29	320.29

These volumes may be evaluated as cubic feet, cubic meters, etc.

A portion of this air is required for the oxidization of certain elements in the charge and additions.

*Copyrighted 1920 by A. D. Williams. In this series have appeared the following: Jan. 1, empirical nature of hearth proportions; Jan. 8, flow of gases within the furnace; Jan. 29, port and roof design; Feb. 12 and March 18, regenerators.

upon the combustion or burning of 100 molecular volumes or 2.232 cu. m. of the gas fuel under consideration for use in the furnaces.

	Required for Heating		Available from Products of Combustion	
	Gas Checker	Air Checker	Gas Checker	Air Checker
Temp. top of checkerwork, deg.	1200	1200	1700	1700
Temp. bottom of checker, deg.	600	300	800	600
Temp. increase or decrease, deg.	600	900	900	1100
Heat capacity in calories at .....1700 deg.	...	...	4140	4140
(Based upon 100 1200	960	1700	...	...
molecular volumes 800	...	...	1750	...
of the gas burnt 600	450	...	...	1250
from curve of Fig. 300	...	480	...	...
20.)				
Heat in calories per 100 molecular volumes of gas burnt to be given or absorbed from checkerwork	510	1220	2390*	2890*
Heat in calories per cubic meter of gas burnt to be given out by or absorbed by checkerwork	228.5	546.6	1071*	1295*

By assuming that 2 cu. m. of gas are burned the proportion of the products of combustion required for the heating of the two checkers may be arrived at:

	Heat Required for		Heat Available from Products of Combustion	
	Gas	Air	Gas Checker	Air Checker
For gas: 228.5×2.....	457	...	...	...
For air: 546.6×2.....	...	1093.2	...	...
Available in products of combustion	...	...	1071	1295
Total required and available.	1550.2		2366	
Per cent of total required....	29.48	70.52	.....	
Heat available required for the gas checker = 2366 × 29.48	...	...	697.5	...
Heat available required for the air checker = 2366 × 70.52	...	...	...	1668.5
Volume of products of combustion required for gas checker, 697.5 ÷ 1071, per cent....	...	...	65.13	...
Volume of products of combustion required for air checker, 1668.5 ÷ 1295, per cent.....	...	...	...	128.86
Total per cent waste gases..	...	...	193.99	
Correction to make 200 per cent	...	...	6.01	
Corrected per cent values....	...	...	67.00	133.00
Reducing these to a 100 per cent basis	...	...	33.50	66.50
Calories per cubic meter of gas burned	228.5	546.6	359	861
Volumes per cubic meter of gas burned	1.00	1.87	0.9†	1.78

The surplus heat over that required for the preheating of the gas and air will be:

For the gas checker: 359 — 228.5 = 130.5 calories
For the air checker: 861 — 546.6 = 314.4 calories

This surplus supplies the heat lost by radiation, conduction and convection from the checker or regenerator chamber and should these losses be not sufficient to absorb this amount of heat the final temperature of the products of combustion leaving the checkers will automatically increase until the heat carried back into the furnace by the air and gas plus these losses equals the amount of heat given to the checkerwork by the products of combustion.

The maximum quantity of gas required will be:
3.5 (cu. m. per kg.) × 1.25 (kg. coal) = 4.375 cu. m. per sec.

The maximum quantity of air required will be:
4.375 × 1.87 = 8.182 cu. m. per sec.

The maximum volume of the products of combustion will be:
4.375 ×2.68 = 11.725 cu. m. per sec.

These volumes are reduced to zero Centigrade and 760 mm. of barometric pressure.

*Note: These values give the total amount of heat available in the products of combustion of 100 molecular volumes or one cubic meter of the gas cooled through the assumed temperature range of either the gas or the air checker, and which must be divided between the two checkers.
†2.68 volumes × 0.335 and 2.68 × 0.665.

The average volumes will be as follows:
of gas: 3.5 × 0.5 (kg. of coal) = 1.75 cu. m. per sec.
of air: 1.75 × 1.87 = 3.273 cu. m. per sec.
of products of combustion: 1.75 × 2.68 = 4.69 cu. m. per sec.

	Reversal Period 20 min. 1200 sec.	Reversal Period 30 min. 1800 sec.
Gas:		
Max. calories = 4.375 × 228.5 × t =	1 200 000	1 800 000
Air:		
Max. calories = 4.375 × 546.6 × t =	2 871 000	4 306 000
Gas:		
Av. calories = 1.75 × 228.5 × t =	480 000	720 000
Air:		
Av. calories = 1.75 × 546.6 × t =	1 148 000	1 722 000

Allowing for a range of 200 deg. in the checker brick and 90 per cent of its weight as effective, the weight of brick required will be:

For gas:		
20 min.: 1,200,000 ÷ (200 × 0.25 × 0.90)	26 667 kg.	.....
30 min.: 1,800,000 ÷ (200 × 0.25 × 0.90)	.....	40 000 kg.
For air:		
20 min.: 2,871,000 ÷ (200 × 0.25 × 0.90)	63 800 kg.	.....
30 min.: 4,306,000 ÷ (200 × 0.25 × 0.90)	.....	95 680 kg.

The brick will weigh about 1800 kg. per cu. m.; therefore the volume occupied will be:

For gas:		
20 min. period, 26.667 ÷ 1800, cu. m.	14.32	....
30 min. period, 40,000 ÷ 1800, cu. m.	....	22.23
For air:		
20 min. period, 63,800 ÷ 1800, cu. m.	35.45	....
30 min. period, 95,680 ÷ 1800, cu. m.	....	53.13
Increase in temp. in checkerwork, deg.	Gas	Air
Gas: 1200 — 600 =	600	...
Air: 1200 — 300 =	...	900
Average temp. in checkerwork, deg.		
Gas: (1200 + 600) ÷ 2 =	900	...
Air: (1200 + 300) ÷ 2 =	...	750
Average time in checkerwork, sec.		
At 100 deg. increase in temp. per sec.	6	9
At 200 deg. increase in temp. per sec.	3	4.5
Gas: Aver. volume per sec. at 900 deg., cu. ft. 1.75 × (1 + αt) =	7.53	....
Air: Aver. volume per sec. at 750 deg., m. 3.273 × (1 + αt) =	...	12.28
With 200 deg. per sec. increase in temp, the volume required for the passes will be, cu. m.		
Gas: 7.53 × 3 =	22.59	....
Air: 12.28 × 4.5 =	....	55.26

With a temperature rise of 100 deg. per sec. the volume required for the passes will be double the above.

Fig. 18, (page 806, THE IRON AGE, March 18) shows that with the usual period between reversals, there will be no economy in increasing the thickness of the checker brick over 2.5 in. (63 mm.), which is a standard shape.

The volume occupied by the checker brickwork will be the sum of the brick volume added to the pass volume and requires no explanation. With a different producer gas and a different air proportion there would be a corresponding change in the amount of heat interchange required and in the volumes required for the brickwork and for the passes.

The height of the checkerwork should be made as great as possible, say 5 (16.4 ft.) as a minimum. The flues below the checker should be proportioned to permit free flow to the passes at a low velocity. If desired, the height of these flues may be stepped down, proportionally to the distance from the inlet. This, however, introduces complications in the brickwork with comparatively little gain.

The vertical velocity of the gases leaving the checkerwork may be considerable and it is necessary to provide sufficient space above the checker to get rid of the eddies which will be formed. Unless sufficient space is provided these eddies will cause considerable interference with the flow of the gas from the checker chamber into the slag pocket, converting what should be a smooth regular flow into a series of bursts or blow-throughs. These bursts may have entirely different periods in the air and gas chambers and result in considerable irregularity of combustion and waste of fuel.

(To be continued)

GERMAN WAR COPPER SUPPLY

Inside History of Methods Adopted to Get Copper and to Provide Substitutes

Valuable and interesting information regarding Germany's copper consumption and supplies during the war and the means of economizing and recovering the metal is contained in an article in *Technik und Wirtschaft*, as contributed by Herr Schulz. An abstract appeared in an issue of *Technical Review*, London, which was in part as follows:

Annual Needs

The annual German requirements of copper for military and naval purposes being about 120,000 tons, whereas the production from the home mines was only a little over 23,000 tons in pre-war days (declining to half that amount in a short time, owing to the mobilization of the miners), it soon became necessary, after the blockade, to requisition some portion of the million tons of copper existing as utensils and other manufactured articles. The first levy on domestic utensils yielded 40,000 tons, and considerable quantities were obtained from bells, roofing sheets, guttering, copper stills, etc., together with the spent ammunition systematically collected by the army authorities after the war of position had set in.

During the first two years of the war the deficit was partially covered by booty from Belgium, France and Russia. Large quantities of scrap copper and brass were collected from munitions works and from fittings on naval and mercantile vessels, the scrap being smelted and refined, and then converted into electrolytic copper.

Cupriferous slags were treated by the Dwight-Lloyd process, the roasted product, with 30 to 80 per cent of copper, being refined to 89 to 90 per cent and cast into cathodes.

Brass scrap was smelted in basic Bessemer converters in which, by using a compressed air blast, the refining process was shortened from several days to a few hours. The zinc fumes were cooled in a system of tubes to 50 deg. C., and collected in bag filters, the contents of which were compressed into blocks and converted into pure zinc by the electrothermic process.

Copper and Tin from Bronze

Bronze scrap, with about 90 per cent of copper and 10 per cent of zinc was successfully treated by electrolysis, the melted metal being formed into cathodes which were electrolyzed in copper sulphate, several weeks being required for the deposition of the copper. The dried sludge from the process contained up to 60 per cent of tin, which was recovered as pure metal.

By instituting a system of checks on waste in recovery, it was found that the losses in remelting brass were only 2 to 2½ per cent, and in casting and machining, 6 to 8 per cent. With condenser tubes (70 Cu., 29 Zn., 1 Sn.), 3 per cent of copper and 7 per cent of zinc; with turbine vanes (72 Cu., 28 Zn.), 2½ per cent of copper and 3 per cent of zinc; and with copper tubes, 2 per cent of metal, most of which (1.3 per cent) was recovered from the sludge.

In order to increase the output the Mansfield mine worked ore as low as 0.8 per cent of copper, and thus succeeded in producing 2400 tons of metal per month; and the Bor copper mine, captured in Serbia, was made to yield about 14,000 tons per annum; while a few hundred tons were obtained from the Plakalnitza mine in Bulgaria.

Substitutes for Brass

To minimize the consumption for army purposes, all brass and copper uniform badges, etc., were abolished, zinc replaced brass in munitions, and zinc, aluminum or iron was used for conducting wires. In spite, however, of all these economies, the consumption remained enormous, and by the end of 1916 stocks had become exhausted. This necessitated the substitution of iron in cartridge cases, caps, and driving bands, all tubes and wires in electrical plant, torpedo tubes and propellers on small war vessels. For medium shells, zinc driving bands were used, and electrolytic iron for those of large calibre.

In the navy cast brass (55 to 60 per cent Cu) replaced admiralty bronze, the tendency of the former alloy to pipe and froth in casting hollow articles being counteracted by making the gate of equal capacity with the mold and allowing time for the included oxides to rise to the surface before actually running the metal into the mold. The risers were also plugged, and the imprisoned air only released when the mold was nearly full. These alloys failed to stand friction, and therefore parts exposed to heavy wear had still to be made of the old alloys. An iron bronze, produced by Goldschmidt of Essen, containing 57.7 Cu, 40 per cent Zn, 1.8 per cent Fe, and 0.4 per cent Pb, could be forged between red heat and dark red heat, and gave clean, compact castings.

Other Novel Substitutes

For ship propellers, attempts to protect steel from corrosion by coating with Cellon varnish or enamel proved unsatisfactory, but better results were obtained by coating with lead, this method being also applied to submarine parts in contact with sea-water; but the speed of torpedo boats with these propellers fell off by ½ knot in two to three months through corrosion. Zinc replaced copper in protecting ships' compasses against the disturbing effect of adjacent iron, and zinc-aluminum alloys were found suitable for conducting wires, etc. Copper tubes were first replaced by brass, and afterwards by steel coated with lead, and condenser tubes by pressed brass (62 per cent Cu), which in some cases proved better than 98 per cent copper, the former not requiring to be tinned if hard-drawn. Iron acted satisfactorily for spacing pieces in steam turbines, but not for vanes, and nickel-plated or enameled steel also failed to answer for this purpose. More promising results are expected from nitrogenized iron, prepared by a process in which the heated vanes are exposed to a current of gaseous ammonia, the nitrogen of which combines with the iron, while the hydrogen reduces any superficial oxide.

Though aluminum can be used in land installations for conducting wires and their connecting sleeves, small armature windings and collectors, if protected from abrasion or contact with copper or iron in damp air, it is too liable to corrosion by sea water to be used on submarines, the electrical plant of which was the chief consumer of copper in the navy; and copper had to be retained, especially for movable cables, which are subjected to rough handling. Aluminum was used in some cases to replace lead for wires of small sectional area (about 1.5 sq. mm.).

Locomotive Building in Belgium

WASHINGTON, April 27.—Although all the locomotive works in Belgium, except two, have resumed operations little has been done as yet toward the production of new engines, according to information forwarded by Vice Consul Carl C. Lumry, at Brussels. All Belgian builders are occupied at present in overhauling locomotives of the State Railway, including the light railway lines. A number of locomotives which were ordered in 1914, material for which was hidden and escaped the attention of the Germans, are now being completed, as are also a number of locomotives intended for the light railways and a small number for the use of Belgian industry. Present conditions of production are considered very unfavorable on account of the cost and scarcity of all raw materials, the reduction in the hours of work, the demands of the workers, and the exodus of many of the better workmen to France and England, where wages are said to be even higher.

The Belgian Government has recently placed an order with Belgian builders for 100 locomotives; this in addition to the order placed in the United States for 150 locomotives. It is thought that it will be necessary to place another order with foreign builders for locomotives and railway equipment in the near future, as the Belgian works are not in position to take care of the Government's needs.

UNITED STATES EXPORTS

Comparison of Tonnages Sent Abroad During the Past Five Years

WASHINGTON, April 27.—In an effort to shed additional light on the extent of increased exports during the past few years, the Bureau of Foreign and Domestic Commerce has compiled a table showing quantities of 47 classes of principal domestic exports during the fiscal year ending June, 1914, the last year before the war, and each successive year up to the fiscal year ending June, 1919. These 47 classes embrace the 100 principal commodities of domestic exports for which quantities in weight or in units which can be readily reduced to weight are stated. The purpose of the inquiry is to get a more satisfactory basis of comparison in view of the confusion caused by the large increases in values of exports during the war period. Inasmuch as most of the export figures made public are in terms of value, the enormous jumps in totals have tended to give a somewhat erroneous impression. The compilation of the bureau, however, shows increases in quantities in 38 of the 47 classes in 1919 as compared with 1914.

The aggregate value of the articles in the table is $1,511,000,000 in 1914, representing 65 per cent of the total domestic exports, and $4,443,000,000 in 1919, equal to 63 per cent of the total. The total quantity for the articles amounts to 50,116,722 short tons in 1914, 61,824,227 tons in 1918, and 62,000,380 tons in 1919. The increase in the total weight of the 100 commodities included in the 47 classes exported amounted to 23.4 per cent in 1918 and to 23.7 per cent in 1919, over the tonnage exported in 1914. The value of these articles thus increased nearly three times from 1914 to 1919, but the weight increased from 1914 to 1919 less than 25 per cent.

The comparative weights of iron and steel commodities included in the table are as follows:

	1914	1916	1917	1918	1919
Iron ore, tons	1,004,547	924,020	1,024,940	1,185,769	1,356,602
Sheets and plates of iron and steel, 1000 lb	834,314	1,100,782	1,551,062	1,773,268	2,349,645
Billets, ingots, etc., of steel, tons	46,926	962,097	1,935,026	1,970,831	911,695
Bars or rods of steel, 1000 lb	460,557	1,785,538	2,009,743	1,790,466	1,511,123
Rails of steel, tons	338,613	537,918	594,389	430,347	621,690
Wire, barbed and other, 1000 lb	367,569	1,379,961	1,221,596	794,072	860,518
Pig iron, tons	201,995	286,728	834,930	377,012	345,412
Structural iron and steel, tons	296,282	270,311	339,486	240,384	340,584
Tin plates, terne plates, etc., 1000 lb	105,906	516,257	521,861	560,068	527,330
Pipes and fittings, 1000 lb	539,246	399,250	547,381	404,969	500,396
Nails, 1000 lb	97,577	319,776	333,432	284,983	259,333
Bar iron, 1000 lb	23,072	157,964	144,889	112,539	183,184

The compilation of the bureau does not pretend to give an accurate statement covering all exports, for the reason that highly manufactured commodities, such as parts of automobiles, other vehicles and parts of other chemicals, electrical appliances, machinery, manufacture of brass, copper, iron and steel, etc., are shown only in terms of value in the official records. Quantities for some articles also are stated in units which cannot readily be converted into weights, for example, horses, mules, other animals, automobiles, locomotives, and engines are stated in number, cotton cloths in yard, boots and shoes in pairs, and so on.

The exports from the United States, including all classes of commodities, increased in value from $2,364,579,148 in the fiscal year ending June 30, 1914, to $2,768,589,340 in 1915, $4,333,428,880 in 1916, $6,290,048,394 in 1917, $5,919,711,371 in 1918, and $7,232,798,743 in 1919.

The exports in March took an unexpected jump, according to figures just made public by the Bureau of Foreign and Domestic Commerce. The total exports in March were valued at $809,974,128, which is the second largest total on record. The record total was recorded in June, 1919, when exports were valued at $928,000,000. Exports for February were $646,000,000, and for March, 1919, were $603,000,000.

The exports for the nine months ended with March totaled $6,031,000,000, or more than one billion dollars in excess of the $4,985,000,000 recorded for the corresponding period of 1919.

A new record was established for imports in March, the total being $483,000,000, which is $10,000,000 higher than the previous record established in January, when the total was $473,800,000. The total imports in February this year were valued at $468,000,000, and in March of last year were $268,000,000. For the nine months ended with March imports totaled $3,719,000,000, or approximately a billion and a half more than for the corresponding period of the previous year.

Chromite Production in 1919

The maximum domestic production of chromite was reached in 1918, when 82,430 gross tons of crude ore was shipped and when 42,687 tons was left in the hands of the miners at the end of the year. In 1919, according to J. S. Diller, U. S. Geological Survey, the shipments reached only about 3900 tons, of which about 1000 tons was mined in 1918. The shipments from California alone, chiefly from five producers, amounted to nearly 2000 tons; the remainder was shipped from Oregon, Wyoming and Maryland.

Prices have been falling ever since the armistice was signed and apparently have not yet reached the bottom. Lump ore containing 45 to 48 per cent of chromic oxide is selling at 20c. per unit f. o. b. at points in California, and concentrates containing 48 to 50 per cent of chromic oxide are selling in that state for 40c. to 50c. per unit.

The total imports of chromite in 1919, according to the Bureau of Foreign and Domestic Commerce, amounted to 61,404 tons, which was only 61 per cent of the quantity imported in 1918 and a smaller quantity than has been imported during any year since 1912.

Manganese Ore from the Caucasus

It is reported that, according to a cablegram to Commerce Reports, from Consul Charles K. Moser, Tiflis, there was no production of manganese ore in 1918 and 1919. The only export recorded was 1600 tons to England in December, 1919. Manganese constitues at present a government monopoly, and its exportation is possible only by special agreement—a condition resulting in the stagnation of trade.

The twenty-fifth anniversary of the George Rahmann & Co. leather belting, New York, was celebrated April 12 at a dinner at the Hotel McAlpin, that city. The founder, George Rahmann, and all those allied with him at the inception of the company, were present. Mr. Rahmann was given a silver loving cup by his employees. Messrs. Krapf, factory superintendent, and D'Alleinne, the oldest employee, were presented gold watches. Each one present received a silver pencil, so designed as to serve also as a 6-in. rule. Arthur Rahmann reviewed progress since the twentieth anniversary of the company. Fifty per cent of the employees of the company have served for 20 years or more.

The Triangle Equipment Co., Munsey Building, Washington, has been organized to deal in railroad and contractors' equipment. The officers are W. P. Gleason, president; Richard E. Lewis, manager, both previously with the Pennsylvania Railroad, and Anderson Allyn, treasurer, formerly with the directory of sales, War Department.

The American Brass Co. will build a new copper mill at its plant, in Buffalo, this summer. It will be one story and will cover a ground space of 150 x 650 ft. It will be of brick, steel and metal sash construction and will cost about $600,000.

Need of Increased Production Stressed

National Metal Trades Association Convention Discusses Important Subjects — Employee Representation Advocated and Attacked — Report on Industrial Education

OF the many important problems confronting our industrial life to-day, discussed at the twenty-second annual convention of the National Metal Trades Association, held at Hotel Astor, New York, Wednesday, April 21, and Thursday, April 22, the great need of increased production probably attracted as much attention as any. It was clearly demonstrated that increased production is necessary to modify much of the existing unrest, not only among labor, but the general public as well, and that the future success of industry depends upon it.

With that idea firmly impressed upon the minds of the more than 400 members who attended the convention, ways of increasing production by various methods were debated, especially methods as applied to shop representation, finance, transportation, immigration, legislation and other forms, and throughout the sessions it was evident that constructive measures are being adopted by the members in their respective industries. While the dangers of various features entering into our industrial life were frequently pointed out during the discussions, the general impression gained by those present was that the country has before faced tremendous problems and overcome them and that to-day industry has sufficient confidence in labor to feel assured that the obstacles which confront this Nation can be met and can be overcome by co-operation on the part of capital, labor and the general public.

A. E. NEWTON
President

The Officers Elected

OFFICERS for the ensuing year were elected as follows: President, A. E. Newton, Reed-Prentice Co., Worcester, Mass.; first vice-president, George A. Rockwood, Rockwood Mfg. Co., Indianapolis; second vice-president, W. W. Coleman, Bucyrus Co., South Milwaukee, Wis.; treasurer, F. C. Caldwell, H. W. Caldwell & Son Co., Chicago; councilors for two years, Albert J. Ford, the Fuchs & Lang Mfg. Co., New York; A. W. Foote, the Foote-Burt Co., Cleveland; J. B. Doan, the American Tool Works Co., Cincinnati; F. E. McKee, Manning, Maxwell Moore, Inc., New York; D. M. Wright, Henry & Wright Mfg. Co., Hartford, Conn.; J. W. O'Leary, Arthur J. O'Leary & Son Co., Chicago; (to fill the unexpired term of George W. Rockwood) Paul C. De Wolf, Brown & Sharpe Mfg. Co., Providence.

WM. W. COLEMAN
Second Vice-President

President O'Leary's Address

In his opening address, President J. W. O'Leary touched on various developments bearing on the industrial world during the year. In speaking of the radical tendency shown in the past year with resultant strikes, he said the latter were called in establishments where conditions were of the best as to hours, wages and working conditions. He felt it made no difference whether an establishment was operating under a works council plan, a so-called profit-sharing plan or any other of the much discussed "cures" for industrial ills, and that where organized labor was involved, the recognized officers of the organization apparently had no control.

"The steel strike and the first industrial conference applied the brakes for the first time since our entrance into the war, to the rapidly growing tendency toward the closed shop and the control of American industry by an autocratic group claiming to represent American labor."

He believes the American working man is fundamentally sound; he is entitled to the facts as they actually are. Given those facts, he can be relied upon to help bring this nation through the crisis safely.

In speaking of the need of greater production, President O'Leary said:

"Careful studies of wage systems based on production are necessary, if we are to maintain production. Such systems of payment are the only corrective of the prevailing fallacious idea that wages ought to be based on the cost of living. Careful studies of the consumption requirements of the markets open to us both in the United States and in the world, are necessary before we can properly determine whether the workday can be shortened or must be lengthened.

"We do desire that the standards of living, which are constantly advancing, continue to advance, and we would be unfair, were we to submit to such reduction of production under the consumption requirements either by restricted effort or by shortening of hours."

In conclusion he said: "Two years ago, when you first elected me as your president, I was assured it would place little burden upon me; that the Association was so well organized that I could be assured of a position more of honor than of work. So far as the customary details of operation are concerned, the statement was correct. I found, however, increasing responsibility in the organization with respect to outside matters has required a great deal of time, and I have wished many times that I might be relieved. Now that I have completed my service, I look back with satisfaction on the loyal support I received from both the membership and from the staff, and I am looking forward to even greater success and progress under the succeeding administrations. I am satisfied that I have had a part with you in successful accomplishment during two trying years."

Association Has Grown

At the 1919 convention the Association had 776 members. According to the report of Homer D. Sayre, secretary, for 1920, there was a gain of 193 members,

bringing the total up to 969. During 1919, three new branch offices were opened, at Grand Rapids, Saginaw and at Jackson, Mich., which are successfully operating and in the hands of efficient management.

Notwithstanding the additional operating expenses which, according to Frank C. Caldwell, treasurer, were necessary because of the general trend of costs of everything, the association's financial affairs are in splendid condition. He intimated, however, that as a precautionary measure, a special assessment will be called for the purpose of meeting whatever increase in operating executive costs may arise. Payment of the assessment will be in quarterly installments.

Commissioner Hibbard's Report

John D. Hibbard, commissioner, in his report brought out the fact that more labor trouble was experienced during the past year in the West than in the East by association members; that machinists were responsible for a large share of the troubles; that many of the strikes were based on the 44-hour week, horizontal wage increases and other and minor important principles, but always for recognition of the union or the union shop committee.

He said that of the 557 members reporting, 76 per cent of their employees worked more than 48 hours per week, that 20 per cent worked the 48 hours and the remaining 4 per cent worked less. He feels that those employers who lean toward a basis of shorter week are making a mistake, for such a basis means less production. Over-time, he thought, was simply an effort by the employer to make his business attractive to labor, and that it encouraged rather than discouraged labor troubles. At the present time, there is little labor trouble in the member centers, but serious trouble is expected from Cincinnati machinists.

Progress of Educational Plan

In the absence of Harold C. Smith, chairman, W. M. Taylor, a member of the committee on industrial education, read that committee's report, which was largely confined to the problems presented in 1919 in connection with the committee's purpose, especially the problem of the best method of education. In addition, a brief sketch of the work accomplished by Philip C. Moltre, whom the committee selected to take charge of the work and to act as field man, was given in this report.

Mr. Moltre gave a more detailed account of the work accomplished by him both in the preliminary and productive stages. He reported for duty July 7, 1919, spent two days in Chicago and then started active work. Preliminary efforts were confined to the Chicago field, largely because of the location of the National association's office there, which provided for better cooperation and helpful advice and suggestions from that organization and its officers.

From there the field work was extended to Muskegon, Mich., Worcester, Mass., New Haven, Conn., and Indianapolis, in the order named, with varying but generally constructive results. Mr. Moltre reported in part:

"To summarize the field work to date, I wish to report that nearly all the members visited thus far are agreed that some sort of training or industrial education is necessary to meet present conditions and future needs in the metal working industry. It seems to be the consensus of opinion that the technical, trade and vocational schools are of some assistance, but that the great mass of workers must be developed for industry by industry. Naturally we are not all agreed as to the development of the workers, as each manufacturer has an individual problem which must be met in the manner best fitted to his specific needs.

"The method of apprenticeship, training by the foreman, training by special instructors, the vestibule school, or a combination of two or more of these methods have their application in the shops of the members. Another development which needs thought is the central training school to give preliminary training to the workers, and act as a pool from which help can be drawn as needed. This idea is being considered seriously in several districts as being the ultimate solution of present difficulties.

"Matters relating to the financing and management of such an establishment will need careful consideration before it is attempted. What your committee is interested in is, that each member do something toward training his workers, and we will give all possible assistance in discovering the method best applicable to his needs, and if necessary, assist in getting the training under way.

"In the shop where highly trained mechanics are needed, either the apprentice school or else the technical apprenticeship will best meet the need. Where specialists are needed on repetition work, and the turnover is large, the vestibule school best meets needs. When specialists are needed and the work is such that it is difficult to replace or segregate, training on the floor by a general training man is perhaps the best method, although when specialists on heavy machine tools are needed, they can be trained in the fundamentals of setting up, tool grinding, operation, the principles of safety, etc., in a separate school on small machines, and only a minimum of time will be needed in learning the operation of the heavy tools.

"In my opinion, the method of tagging or marking a machine or group of machines on the production floor, and using them for training under the direction of a special instructor, while better than the haphazard training about the plant, is not as satisfactory as training given away from the production shop, because the average new worker is usually nervous and overanxious, and if given the opportunity, will compare his poor effort with the production of the experienced workers about him, usually becoming discouraged, and another item appears on the turnover sheet. When training is segregated, correct work habits can be taught, and the distractions of the production department have no effect. After these correct habits are formed, speed can be acquired, either in the training room or in the production department, depending on how badly operators are needed."

Wages Outstrip Cost of Living

"THE manufacturers' weakness in the past," said M. W. Alexander, general manager, National Industrial Conference Board, Boston, who followed Mr. Moltre, "is that they did not have the necessary information, in convincing facts, to combat charges made by labor." As an illustration, Mr. Alexander called attention to the recent miners' wage conference at which the miners submitted to the operators three briefs which in substance said that the high cost of living made it necessary for the miner, with a family, to receive $2,250 per annum as a minimum wage to insure a decent living.

"The operators knew the figures were wrong, but they couldn't prove it, and their only rejoinder was, 'We don't believe your figures.' So they sent to Boston for help and the next day proved at the conference that the miners' figures were padded. Undoubtedly the operators saved a vast amount of money."

By the aid of numerous charts, Mr. Alexander showed, among many things, the relation of the advance in wages to the high cost of living. From authentic sources the National Industrial Conference Board, he said, found that to March, 1920, the average cost of living increased 95 per cent from the July, 1914, level. In that time, clothing showed the greatest advance and, according to figures compiled since March 31, last, was still tending upward. Since February, 1920, the course of foodstuffs prices has been downward, slow to be sure, but nevertheless downward.

And Mr. Alexander also demonstrated by charts that the high cost of living has lagged behind the cost of wages in leading industries. A chart giving a comparison of changes in hourly and weekly earnings with changes in the cost of living, taking the condition in 1914 at 100 points as a basis, showed hourly earnings in the metal manufacturing industry increased from 100 to 216 points or per cent, in weekly earnings from 100 to 223 per cent, and in the cost of living from 100 to 195 per cent.

Another interesting chart, giving a comparison of index numbers of changes in average weekly earnings of male workers in different industries with those applying to the cost of living, showed that earnings in the metal trade rose from 100 to 223 per cent, in cotton from 100 to 244 per cent, in wool from 100 to 254 per cent, in silk from 100 to 216 per cent, in boot and shoe from 100 to 212 per cent, while in the cost of living it rose from 100 to 195 per cent above the July, 1914, level. The comparative smallness of the advance in weekly wages of silk and of boot and shoe employees is due to the lack of the bonus system, but even in these cases wages advanced faster than the cost of living.

Mr. Alexander said the figures compiled by the National Industrial Conference Board checked up with similar investigations made by the Government in 1901 and 1918, except that the Government figures showed a slight dislocation in computation of foodstuff, shelter and sundries prices. To make the high cost of living the basis for wages is economically wrong, according to Mr. Alexander. He said it was right to increase the wage of the workman from $10 to $20 weekly, if the cost of living has advanced 100 per cent, but it was not right to increase the salary of the man getting $100,000 to $200,000, because the latter did not spend all of his $100,000 for living.

He declared that the railroad engineer was paid more than any other branch of labor in this country and that he has had his wages advanced all out of proportion and branded him as a profiteer. Mr. Alexander's address closed the morning session.

Banking Houses Disturbed

At the afternoon session Murray Shipley, The Trailmobile Co., Cincinnati, and first vice-president of the association, presided. He introduced as the first speaker George E. Roberts, National City Bank, New York, who dwelt at some length on the uneasiness of the banking interests of the country regarding international and domestic money affairs and what he considered the remedy.

Looking back over the developments and events of the past year, Mr. Roberts said he had arrived at the conclusion that the man who failed to bother himself with fundamental things has been the most successful. This man, he said, had not worried over the foreign exchange situation, while the bankers were greatly disturbed, as it related to our future domestic business. Pointing out that during the past five years the balance of our foreign trade was more than $16,000,000,000, he said that during the first two of these years Europe settled in part by the shipment of gold, partly by the resale back to us of American securities, and in part by the sale in this country of foreign obligations.

After we entered the war, the balance in foreign trade in our favor was partly offset by Government loans to the Allies. Finally the foreign governments announced they would make no further effort to support foreign exchange and a decline in rates set in which was not checked until last February. Nobody, said Mr. Roberts, has any confidence in this state of trade, for it can't go on forever. Foreign obligations must be paid some time, and we can't get conditions in this country back to normal until Europe gets back on a normal production basis.

In this country, Mr. Roberts said, there was no longer a definite standard of value. Our gold production is declining rapidly because it cannot be mined profitably. In 1919, the production of gold was $58,000,000, as compared with $119,000,000 in 1917, and this year it will fall to the forties. "The gold mine cannot compete with the coal mine for labor. We must draw upon our reserve supply of gold to supply the needs of the jewelry manufacturers." He stated that the real need of the world to-day is greater production and greater capital, that the world never needed capital as it does to-day. Labor is dependent upon the capital invested in industry, and somebody must supply the capital if society is to go on.

Industry Built on Immigration

Industry in this country has been built on the steady flow of immigration, according to Dr. Richard H. Waldo, Inter-Racial Council, New York, who declared that there was a shortage in our normal supply of labor to-day amounting to more than 5,000,000, and that in hiring help away from each other, the manufacturers of this country simply are robbing Peter to pay Paul. This policy, he said, cost the manufacturers in 1919 approximately $30,000,000.

With 5,000,000 workers short, the consumption of staple goods is increased just so much. Dr. Waldo declared that the American Federation of Labor leaves no stone unturned to keep the supply of labor down to the smallest possible scale, and that it is simply cutting the ground away from under its own feet, although it cannot see it. He then went on to explain how Americans were having goods manufactured in Germany and the effect this will have on the American labor situation. He believes that it will result in labor being held in foreign countries to manufacture goods for the United States, the highest market in the world.

He asked those present what they were doing about immigration and answered the question himself—"Nothing." He declared that a well considered policy of immigration is needed. Dr. Waldo said that the cooperation of the National Metal Trades Association in this matter would be the biggest piece of construction it possibly can undertake.

Open Shop Label

The address of E. N. McCone, general manager, the Buffalo *Commercial*, Buffalo, on the Closed Shop Press brought a prolonged demonstration of approval at its conclusion, and there were many requests to appear before bodies elsewhere. Mr. McCone's paper is run on the open shop principle of which he is a strong advocate. He presented a page advertisement running in his paper from time to time urging the use in this country of a non-union label. It states that the label is designed to afford American manufacturers and business men an emblem indicative of independence of unions. The label takes the form of a shield which is inscribed "Product of an Open Shop." Mr. McCone stated that he has taken up with a number of the leading industrial concerns of the country the use of the label and that he just received a letter from the secretary of Judge Gary, United States Steel Corporation, which states that it is hoped to have the shield on all printed matter issued by that corporation.

Needs of the Railroads Described by Mr. Dunn

PRESIDENT O'LEARY, following the banquet, which was held on the evening of the twenty-first, complimented the members of the association on the spirit of the convention. During the war, he said, we showed a wonderful spirit of patriotism, but after the war we appeared to have had enough of this spirit, and he began to fear possible results from this condition. "But this convention begins to make me feel that the old spirit has come back. I feel that perhaps we feel this way because we still have a big job on our hands. One of the most serious things we have before us, and which we hope within the next year to put behind us, is the transportation problems." He then introduced Samuel O. Dunn, the *Railway Age*, Chicago.

Mr. Dunn pointed out that prior to 1915, commerce in this country grew very much faster than transportation, and that during the period we were engaged in the war our railroads were given over largely to the transportation of munitions of war and of raw materials to the manufacturers of munitions. Following the war, industry continued to grow much faster than transportation, the latter being retarded by strikes. As a result the transportation situation to-day is not only acute, but could easily become desperate. It is obvious, he said, that if we are to get through the immediate crisis and the railroads are to be operated efficiently, all classes must co-operate.

Freight cars must be loaded to capacity, and quick-

ly loaded and unloaded. The average capacity of the freight car is 40 tons, while the maximum average haul is but 28 tons, which shows that unless the railroads are given the opportunity to operate efficiently they cannot handle the business of the country. Adverse criticism was made of Government operation of the roads, especially during the last two months, when a deficit of something like $105,000,000 was shown.

He pointed out that unless the railroads increase their net earnings as large as Government valuation of their properties permit, the carriers will not be able to market their securities, and that unless they can market securities and thereby raise capital needed for equipment they will be unable to take care of the increase in commerce. Mr. Dunn stated that everybody should back the Interstate Commerce Commission in establishing higher freight rates. "It has been said that the railroads probably are making the last test of private ownership. More is involved than the question of ownership of the railroads. The influence of this test will be felt in all branches of industry. We must have increased production, but we can't get it without an increase in railroad efficiency."

The other speaker of the evening was John Temple Graves, who, Mr. O'Leary in introducing said, "enjoys the distinction which few men enjoy—of being intimate with, and having the confidence of, every statesman and politician in Washington." Mr. Graves treated the very serious question, "Why did God Almighty allow the Great War and the pestilence which followed and which was greater than the war itself?"

Shop Representations Fully Discussed

THE entire morning of the second day of the convention was given over to the discussion of "What is Shop Representation?" there being three who spoke in favor of and two against such representation. In each instance the arguments set forward were warmly approved, which clearly indicates that the question is still an open one among the members. That such is the fact was admitted by President O'Leary, who presided, and he was frank to say that the question undoubtedly would be discussed again next year at the convention. It was a question too broad to be settled easily, he said, and the "worst thing we could do is to install shop representation simply because some other fellow did."

R. G. A. Phillips, vice-president, American Multigraph Co., Cleveland, was first called upon, and after a few remarks stated he believed Thomas Wright, manager industrial relations, of his company, was better fitted to present the facts as they existed in his plant. In opening his address, Mr. Wright said that in installing shop representation the men first must be given the right thought. "You can't expect them to get it themselves," he said. "If you do not give them the instruction, they will get notions elsewhere, from the union leaders, for instance, and it clearly is your duty to see they get the right thought."

With the aid of a blackboard he then went on to show how the right idea or thought was conveyed to the workman, showing how business starts with an idea, that to have a business one must have management, capital, raw material, labor and customer, respectively, how labor is just as obligated to the customer as is the management, and how raw material looks to the customer as well as to labor and capital.

Mr. Wright then went on to explain the workings of the labor representative congress in force at the Multigraph plant, telling how the committees of employers compromised in placing the plant on an eight-hour working base instead of a ten hour, by establishing a nine-hour day. He said these men have suggestive powers only, and that is all they want. The company employs approximately 700 and when, some time ago, the machinists in Cleveland were called out to enforce a wage increase of 25 per cent, only a small number employed in the tool room responded. When the labor difficulty was adjusted the shop representation wage and rate committee recommended that eight men employed in the tool room be dismissed.

The company is developing factory trained men in advertising and sales, and although the shop representation program has been in force but one and a half years, four salesmen have been turned out who have made good. One of the committees in force came to the management last September when the last payment on Liberty bonds was due and appealed to the management to devise some means whereby the workmen would continue to save an amount equal to that invested monthly in Government securities.

The workmen tied up with a bank that does a strictly loaning and real estate business, and since November, last, something like $15,000 has been deposited with it by individual deposits of $10 per month. In addition, successful efforts have been made to block wildcat speculation by the 700 employees, and in some instances money so spent has been recovered for the workmen. Members of the various committees are elected at large by popular vote, annually, to serve three years.

Sound Thinking Men Selected

Further enlightenment on the success of shop representation as applied by the International Harvester Co., Chicago, was told by A. H. Young, who engineered its industrial council plan. Mr. Young stated that individual councils exist in most of the plants of the corporation and that 97 per cent of the total number of employees balloted for the adoption of the plan. There are 175 employee representatives, of whom 149 are married, and 79 per cent American citizens; the average age of these representatives is 39 years and four months, and the average time each representative has been employed by the company is seven years and seven months. These figures, he believes, show that no radical element exists in the representation, and that the men chosen are men of soundness.

The Harvester management, he said, is frank with figures, and that the workmen are satisfied with having a "finger in the pie." Speaking of the Chicago labor troubles in July, 1919, Mr. Young said that the men in one plant struck without presentation of demands. He believed that this was due to the fact that 72 per cent of the workmen in the foundry department were Poles. These striking Poles marched to the company's tractor works and succeeded in getting some of the men there to go out in sympathy. Another plant were on strike for almost similar reasons.

The shop representation works council recommended that the tractor plant be closed. A little later this council appealed to the police for protection, not at the plant, but in the residential section, the protection was assured, the plant reopened and the men out at the other plants very shortly reported for work. The company operates a steel mill. When the steel strike was called, 75 per cent of the company's employees remained at work the first day.

The management and the works council decided to close the plant as a precautionary measure, but shortly afterward decided to reopen the mill. When it was reopened, all but 188 employees reported for duty. Since then some of these 188 have returned to work, but not until their cases have been tried by the council. Since the strike, the production of the plant has been increased.

A coal mine also is owned and operated by the company. When the coal strike was called on a Saturday, the works council decided it best, because of holidays, to close the mine until the following Wednesday. Later it was decided to close the mine for the duration of the strike. Eighty per cent of the employees carried union cards and all of the council did. The latter, however, soon got together and decided to reopen the mine which they did, so that it was closed but eight of the 40 days of the strike. Of the miners

themselves, 463 voted in favor of returning to work, while 17 voted against it. Since then the production of the property has been greater than ever before in the history of the company.

Mr. Young stated that the company is highly pleased and satisfied with the results of the shop representation.

Fear of Politics Expressed

In direct contrast with Mr. Young's views, L. R. Clausen, Deere & Co., Moline, Ill., stated he was opposed to shop representation because it was nothing but collective bargaining under another name. It is not necessary, he said, to have shop representation if you are conducting a house building plan, a saving plan, or any other kind of a plan. He said that any plan, shop representative or otherwise, can be worked out if the right kind of a man is at the head of it. "There are even places where the union plan is successful."

Mr. Clausen said that unrest is simply a state of mind, good or bad, and that we always will have it with us. The very desire for progress makes for discontent. He believes there are two real ways open to the workman—one, to save and become a capitalist, and the other, to study and become a manager.

The history of the past 20 years, he said, has proved that labor representation and collective bargaining are the same thing, that it increases the cost of everything, and does not settle for all time disputes. Mr. Clausen asserted that the railroad men were collective bargainers before the union men were, and that they were forced into unionism by the railroad management themselves. He said that collective bargaining in their case has resulted in the Plumb plan.

In shop committees, he believes, the element of politics sooner or later predominates and the feeling grows that all must be treated alike. The individuality gradually sinks out of sight, and Mr. Clausen believes that the average workman does not want anybody to tell him how to work and when to work. He stated that no way has been found yet to make the working man responsible. In industry we have a responsible party on one hand and an unresponsible party on the other side. "The thing that has improved the American workman is the improvement in machinery, the improvement in the method of production and the improvement in the distribution of power."

He believes the individual contract is the solution of the present unrest. It protects the employee and it protects the employer, he says, and brings about a stable relation between capital and labor. It provides a definite time to discuss wages and conditions for man, and provides the proper reward for effort. "The general public respects contracts. All men who have had success have got it through individual effort and individual bargaining, not collective bargaining." The attitude of unions shows they respect the contract inasmuch as their leaders have counselled union members not to break it. "What the workman wants is recognition of the individual and not the mass."

Collective Co-operation

Refuting the charges of Mr. Clausen, C. S. Ching, in charge of industrial relations, United States Rubber Co., New York, the next speaker, said that employee representation was not collective bargaining as his company sees it. Instead it is collective co-operation. Mr. Ching said that any one establishing shop representation to keep out the union will fail in the attempt. The object of shop representation should be to bring the employer and employee into closer understanding of the problems of each. He stated that more had been said and more misunderstood about the problem than any other discussed during the past two years.

He asked those present to remember that in installing the shop representation plan, it must be for the individual plant. The plan exercised in the General Electric plants, by the Standard Oil Co., or by any other company will not help you in your individual case. The shop representation plan is operative in 21 of the United States Rubber Co.'s plants, 14 plants in the United States and 7 plants in Canada.

In summing up his remarks, Mr. Ching said that if the manufacturer does not get to the workman with some plan to meet conditions as they exist to-day, the fellow outside will. We must get everybody thinking right on American industry.

Defends Open Shop

Robert E. Newcomb, Deane Steam Pump Co., Worthington Pump & Machinery Corporation, Holyoke, Mass., took a decided stand against shop representation. He handled his position in the allotted limited time in a forceful manner. He said that the loyalty of master and man in years gone by was thoroughly recognized. But as industry grew the employee felt he lost the personal contact with the employer, and the final result was that both organized to fight each other. He firmly believes that if employees are to have representation in management, the consumer also should have representation.

Social democracy is what the workman wants, he claimed, not industrial democracy. He asked the question: "Will the employer have greater confidence in the shop representative than in the foreman." If so, he should get a new foreman. He also expressed the belief that shop representation will drift to politics, and he also is of the opinion that it will divide the responsibility of management, a most important branch of the business. Then too, he stated there was the danger of favoritism being shown representatives through better jobs, bonuses, overtime, etc.

Then, with the use of a lantern and slides, Mr. Newcomb showed the results of the policy of co-operation through good-fellowship practised at his plant in Holyoke.

An Opportunity Lost by President's Conference

THE establishment by President Wilson of the Second Industrial Conference was one of the most constructive acts of the present Administration, according to Walter H. Drew, counsel, National Erectors' Association, who presented an able analysis of the report of that conference. But he is of the opinion that the conference itself accomplished only that which is so unobjectionable as to be acceptable to everybody. The report, he said, gave little protection to the public, and he charged a deliberate effort on the part of the conference was made to avoid saying anything that would cause friction and call for protest from anybody.

The report recommends employment representation in industry. "Shop councils are practically a new development. In some industries they are working well, and in some not. The most that can be said of them is that they are an experiment. It is indeed unfortunate that the President's conference could find nothing better to recommend than an experiment." In reference to the tribunal proposed in the report, he said:

"Such a national industrial tribunal should be qualified to deal with the fundamental principles; it would then become a great educational influence to which the public would look more and more. But no such large view is found in the report of this conference. In its narrow view, it simply sees two opposing parties, and says: Let's get them together and make them agree as best they can.

"The proposed regional conference boards have no way of enforcing decisions—they merely hear the complaints. By the system union men would be chosen as the employees' representatives and another strong argument would be created for unionizing labor. I can point to many establishments during the war which were unionized with the same arguments. I know that the framers of this plan did not intend it to have this tendency toward unionization.

By this plan, if one of the two sides refuses to go to the regional conference board, the dispute will be placed before the Board of Inquiry with the power to subpoena witnesses. If this body fails to bring about an agreement, it is carried higher to the national body,

and if this highest body cannot decide, nothing happens. If a decision is reached, it frames a trade agreement. The penalty for violating the agreement is merely the publishing in the papers of the name of and facts about the offending side."

The speaker characterized the provision for a 48-hour week as "ungracious and uncalled for" in view of the fact that it would strike a serious blow to the United States Steel Corporation which must necessarily maintain longer hours because of the nature of operations, and which did so much to push the war to successful completion.

As to the conference's policy with regard to wages, he said it had embodied two dangerous assumptions: First, that the employer can pay any wage demanded; second, that if the employer doesn't pay it, the state can compel him to pay a so-called living wage. The speaker said that the most dangerous part of the report was that advocating public employment service, municipal, state and federal. The conference admitted, he said, that such service should be established during this abnormal period of unrest, but would probably not be accepted when industrial conditions were back to normal. This establishment of an only temporary expedient, the speaker thought folly.

Opposed to Metric System

The committee on resolutions, of which Justus H. Schwacke, William Sellers & Co., Inc., Philadelphia, was chairman, presented a resolution against the compulsory adoption of the metric system by this country, which was accepted.

Direct Firing and By-Product Power Production

Report to British Ministry of Munitions Compares the Costs of the Two Methods of Producing Electric Power

(*Special Correspondence*)

LONDON, ENGLAND, March 31.—A further contribution to the literature on fuel economy has been made by the Nitrogen Products Committee in its final report to the Ministry of Munitions. The committee was appointed to consider the relative advantages of the various methods for the fixation of atmospheric nitrogen, and for this purpose it was necessary to ascertain where and how large supplies of cheap power could be best obtained. The investigation of this phase of the subject was chiefly directed to a comparison of the relative merits and costs of electric power production by the direct coal-firing method and by the various by-product processes.

COST OF ENERGY VIA DIRECT FIRING AND BY-PRODUCT RECOVERY SCHEMES—
SCALE 100,000 KW. MAXIMUM DEMAND

Items	£ Per Kw. Year of 8670 Hours for— Direct Firing	High Temperature Carbonization Gas Works Practice	High Temperature Carbonization Recovery Coke-oven Practice	Low Temperature Carbonization (Estimated and based on claims made) System A	Low Temperature Carbonization (Estimated and based on claims made) System B	Complete Gasification of Coal in Recovery Producers	Low Temperature Carbonization of Coal Followed by Gasification of Coke in Recovery Producers (Estimated on claims made) System A	Low Temperature Carbonization of Coal Followed by Gasification of Coke in Recovery Producers (Estimated on claims made) System B
(a) Total cost of coal at 10s. per ton	3.25	4.70	4.70	4.50	4.30	6.15	8.10	7.15
(b) Net revenue from by-products	...	2.77	1.93	3.26	4.30	5.60	10.86	11.26
(c) Cost of carbonizing or gasifying (including capital charges)	...	2.68	1.56	1.94	1.86	2.89	6.36	5.44
(d) Credit to coal: (b) minus (c)	...	0.09	0.37	1.32	2.44	2.71	4.50	5.82
(e) Net cost of coal: (a) minus (d)	...	4.61	4.33	3.18	1.86	3.44	3.60	1.33
(f) Operating costs of power section (including capital charges)	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
(g) Net cost of energy per kw. year	4.70	6.06	5.78	4.63	3.31	4.89	5.05	2.78
Gain (+) or loss (—) as compared with direct firing								
(1) £ per kw. year	...	—1.36	—1.08	+0.07	+1.39	—0.19	—0.35	+1.92
(2) As a percentage on the cost by direct firing	...	—29	—23	+1.5	+29	—4	—7	+40

System A: Carbonization by reduced pressure process (products—ammonium sulphate, tar and light spirit)
System B: Carbonization by special process to promote formation of benzol (products—ammonium sulphate, tar and benzol)

THERMAL COMPARISON OF DIRECT FIRING AND BY-PRODUCT RECOVERY POWER SCHEMES

Scale of Complete Steam Turbo-Electric Installation in each case taken at 100,000 kw. maximum demand. Annual load factor taken at 100 per cent

The calorific value of the coal used in all schemes is taken at 12,000 B.t.u. per lb. as fired, and all surplus fuel products (coke or gas, or both), are used for firing the boilers of the power station. Efficiency of gas-firing is taken at 75 per cent.

Items	Direct Coal Firing Per Cent	High Temperature Carbonization of Coal. Gas Works Practice Per Cent	High Temperature Carbonization of Coal. Recovery Coke-oven Practice Per Cent	Low Temperature Carbonization of Coal System A Per Cent	Low Temperature Carbonization of Coal System B Per Cent	Complete Gasification of Coal in Recovery Producers† Per Cent	Low Temperature Carbonization of Coal Followed by Gasification of Resulting Coke in Recovery Producers.*† System A Per Cent	Low Temperature Carbonization of Coal Followed by Gasification of Resulting Coke in Recovery Producers.*† System B Per Cent
Thermal efficiency of carbonization or gasification, inclusive of fuel requirements for sulphate recovery	...	73.7	73.7	71.9	76.2	56.3	42.2	48.5
Percentage of gross yield of fuel products (coke or gas) available for power production after meeting requirements of carbonization or gasification and sulphate recovery:								
Coke	...	83	100	100	100	nil	nil	nil
Gas	...							
Extent to which gas-firing enters into the power scheme, i.e. ratio of B.t.u. in available gas to total B.t.u. available for power production	...	30.3	10.4	nil	11.9	100	100	100
Comparative overall thermal efficiency of power scheme. (Coal firing taken at 100 per cent. Boiler efficiencies at 75 per cent)	100	69.1	69.1	71.9	75.6	52.5	39.6	45.5
Ratio of coal consumption to that of a direct coal-fired station	1	1.45	1.45	1.39	1.32	1.90	2.5	2.2
Total coal consumption. Tons per kw. year of 8760 hours	6.5	9.4	9.4	9.0	8.6	12.3	16.2	14.3

*Based on claims made, but not yet substantiated in commercial working.
†Net. Steam requirements for producers and sulphate evaporators assumed to be taken from a low pressure stage of the turbines of the main power plant.

So far as it deals with power production, the report is a valuable supplement to the report of the Fuel

Economy Committee of the Iron and Steel Institute, published last autumn. In this latter report the subject was considered from the point of view of an adequate supply of good metallurgical coke, consistent with maximum recovery of by-products and the utilization of the surplus gas from coke ovens and blast furnaces to generate electric power. The consensus of opinion, therefore, favored the conclusion that the most economical way to use coal was to distill it first and eliminate direct firing for power production as far as possible.

The Nitrogen Products Committee, studying the problem from another aspect, reaches a different conclusion and states that in the present state of knowledge the application of by-product recovery processes to power production upon a large scale offers no immediate prospect of reducing the cost of electrical energy from coal below the figures attainable by direct coal firing and the use of large steam turbo-electric units. The following table is given to show the cost of energy *via* direct firing and by-product recovery schemes, coal being taken at 10s per ton, ammonium sulphate at £10 (net) per ton, benzol and toluol at 8d per gallon, and tar at 3d per gallon (1913 prices).

CAPITAL OUTLAY FOR POWER INSTALLATIONS WITH BY-PRODUCT SECTIONS
SCALE 100,000 KW. MAXIMUM DEMAND

	Direct Coal Fired Station	High Temperature Carbonization Gas Works Practice	High Temperature Carbonization Recovery Coke-oven Practice	Low Temperature Carbonization (Possible) System A	Low Temperature Carbonization (Possible) System B	Complete Gasification of Coal in Recovery Producers	Low Temperature Carbonization of Coal Followed by Complete Gasification of Coke in Recovery Producers (Possible) System A	Low Temperature Carbonization of Coal Followed by Complete Gasification of Coke in Recovery Producers (Possible) System B
£ per kw. of maximum load	10.26	20.63	16.45	17.35	17.04	19.20	31.82	28.79
Ratio	1	2.01	1.60	1.69	1.66	1.87	3.10	2.81

It will be noted that claims are made for the low-temperature carbonization processes which indicate a lower cost per kw. year, but the committee is of the opinion that no low temperature plant put in operation has substantiated the claims made in respect of the ultimate cost of energy generated.

Another important point emphasized in the report is that any increase in the cost of coal weighs far more heavily on the by-product method than on the direct firing method, notwithstanding any increase in the value of by-products that may result. At first sight it may seem that an increase in cost of coal would affect all systems equally, but when the over-all thermal efficiencies of the systems are compared the fallacy of this argument is obvious. The price at which coal is available is a vital factor in any power scheme involving by-product recovery. As a given variation in the price causes a greater rise or fall in the total cost of coal per kw. year than in the case of direct-firing, it follows that whatever may be the value of the by-products recovered per ton of coal used, there is a limiting price of coal beyond which direct-firing is the cheaper for the production of power. The following table gives the thermal comparison of direct-firing and by-product recovery power schemes.

The committee reports that the ability of by-product power schemes to compete financially with direct-firing is essentially a question of the availability of coal at a low or moderate price. In the case of some schemes, for example the application of high temperature carbonization to power production, the limiting prices of coal are so low that there is no prospect of their realization. There has been a continuous upward trend in the price of coal, which is likely to persist for some time. To some extent the price of by-products may tend to rise with the price of coal, but no great reliance can be placed on this eventuality.

Another consideration which weighs against by-product power production is that a power scheme aiming at the maximum recovery of all possible by-products and involving both carbonizing and recovery producer sections would probably necessitate a capital outlay about three times as large as that for an equivalent direct-fired station. The following table is given in the report to show the relative capital outlays required for the different processes.

Groton Iron Works Affairs Investigated

WASHINGTON, April 27.—After several months of quiet investigation, the special committee of the House, appointed last July to investigate Government expenditures for ship construction during the war, has finally begun public hearings. The opening hearings were devoted to contracts between the Shipping Board and Emergency Fleet Corporation, and the companies controlled by Charles W. Morse, of New York. The first company to be made a target was the Groton Iron Works, of Groton, Conn., which had contracts for the construction of a number of steel ships, several of which have been launched and are in operation.

The Groton Iron Works was in the hands of receivers from July, 1919, to March, 1920, when the receivership was lifted by order of court and with the consent of the Shipping Board.

W. W. Nottingham, assistant counsel for the Shipping Board, testified that the auditors for the board had insisted that a considerable sum of money, advanced by the board for the construction of ships was in reality used to complete the building of the plant of the Groton Iron Works. It was stated that the Government loaned $1,800,000 toward the construction of a $3,000,000 plant, and that auditors for the board have claimed that instead of obtaining the additional $1,200,000 from outside sources the company actually used other funds advanced for ship construction. The company has been paid altogether $16,200,000.

Other companies controlled by Mr. Morse which had contracts, included the Virginia Shipbuilding Corporation, Alexandria, Va., the United States Steamship Co., and the United States Transport Co. of New York.

Electric Steel Co. Organized

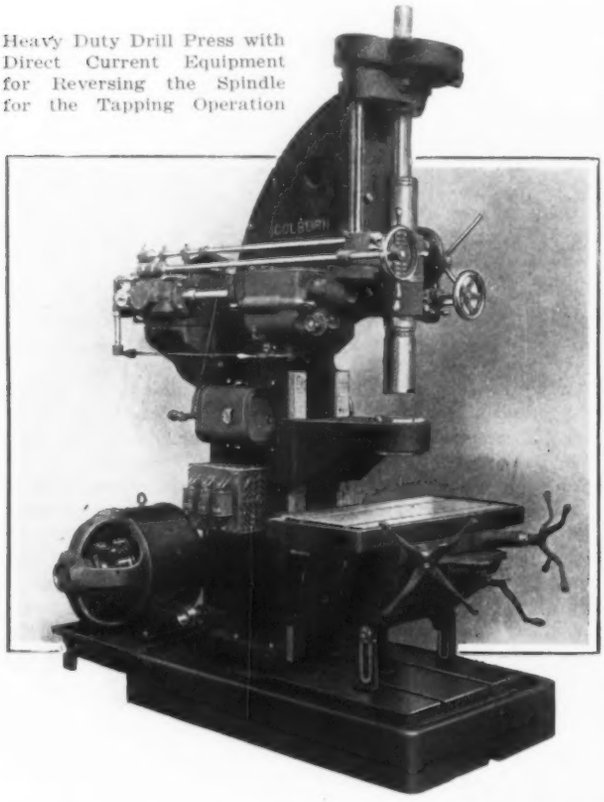
UNIONTOWN, PA., April 26.—The Connellsville Electric Steel Co. was organized this week, the company being the successor to the United States Electric Steel Co., which failed and which was bid in by men identified with the new concern. The company has a plant along the Youghiogheny River, near the West Penn Power House, at Connellsville. It has not been announced when the plant will resume operation. The directors are G. M. Gadsby, R. B. Keating and A. V. Bennett, of Pittsburgh; F. W. Wright and F. E. Markell, of Connellsville. Officers are: G. M. Gadsby, president; F. W. Wright, vice-president; R. B. Keating, vice-president; F. E. Markell, treasurer; G. E. Murrie, secretary.

The Federal Trade Commission has published the first volume of its Decisions, Findings, Orders and Conference Rulings. Bound copies may be obtained from the Superintendent of Public Documents for $1.50 apiece. The volume includes all cases passed on by the Commission from March 16, 1915, to June 30, 1919.

Drill Presses with Electric Control

The accompanying illustrations show two motor driven heavy duty drill presses, manufactured by the Colburn Machine Tool Co., Franklin, Pa., one equipped with a Cutler-Hammer alternating current electric control, the other with the Electric Controller & Mfg. Co.'s direct control for reversing the spindle for the tapping operation. It is explained that these machines have been arranged for reversing the spindle with direct current motors for some time but it is just recently that any equipment has been available which would accomplish this with alternating current motors.

Heavy Duty Drill Press with Direct Current Equipment for Reversing the Spindle for the Tapping Operation



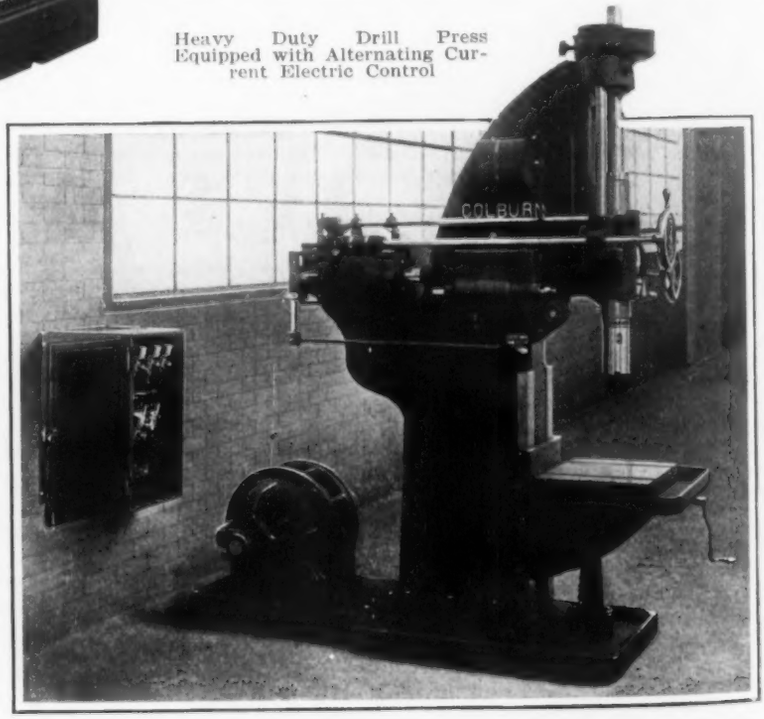
The alternating current equipment consists of an automatic motor starter and a reverse switch. The automatic starter is contained in a metal box which may be mounted directly on the machine or fastened to the wall as shown in the illustration. The reverse switch is mounted on the column of the machine directly above the feed gear box, and is connected to the operating lever by sprockets and chain. It has three positions, forward, neutral and reverse. The operator when tapping a hole, throws the lever to the forward position and when the tap reaches the desired depth, throws it to the extreme opposite position which reverses the spindle and withdraws the tap. To stop the machine the lever is thrown to the neutral position.

The direct current equipment also consists of an automatic motor starter and reverse switch but differs somewhat in mechanical detail from the alternating current equipment. In the illustration the starter and reverse switch are shown mounted directly on the column of the machine. This reverse switch also has three positions, forward, neutral and reverse, and control is carried to the operating lever at the front by means of a lever and link. In operation this mechanism acts similar to the alternating current control.

These heavy duty drill presses are built in three styles and several sizes and although the illustrations show reversing alternating current and direct current motor control as applied to the larger machines, either style of control is adaptable to the smaller drill presses.

The use of electrical control for reversing the spindle of either an alternating or direct current motor driven drill press is explained as eliminating shock and jar, thus to reduce wear and tear on the machine and increase its term of service.

Heavy Duty Drill Press Equipped with Alternating Current Electric Control



Car Manufacturers' Institute

The second annual meeting of the Industrial Car Manufacturers' Institute was held in Pittsburgh, on April 20. A board of directors, as follows, was elected: Lion Gardiner, vice-president The Lakewood Engineering Co., chariman; N. A. Doyle, vice-president American Car & Foundry Co.; W. E. Farrell, president Easton Car & Construction Co.; J. M. Hansen, president Standard Steel Car Co.; J. R. Kilbourne, vice-president and general manager Kilbourne & Jacobs Mfg. Co.; R. J. Magor, president Magor Car Corporation; J. C. Shirer, president the Star Mfg. Co. Col. James Milliken was re-elected president of the Institute and H. M. Wey secretary. The Institute is really a get-together association of a number of the manufacturers of industrial cars, to procure economical results, promote a spirit of co-operation among its members, provide means for interchange of views affecting industrial car building interests, to preserve equitable conditions not only in the workshop but in selling practices, to standardize designs and specifications, and to bring about a uniformity in method of inspection, purchase, etc. In order to secure the best results, the organization has been divided into four groups, according to the class of cars manufactured, namely: builders of—1, coal mine cars; 2, standard gage dump cars; 3, other standard gage cars; and 4, all narrow gage cars, except coal mine cars.

At the country home of Charles H. Clark, president of the Clark Car Co., in the South Hills of Pittsburgh, a dinner was served, after which R. J. Magor, as toastmaster, introduced the following speakers: Lion Gardiner, A. L. Humphrey, president of the Westinghouse Air Brake Co.; Dr. W. F. M. Goss, president of the Railway Car Manufacturers' Association; C. E. Watts, efficiency engineer of the Berwind-White Coal Mining Co. and representing the American Mining Congress; N. A. Doyle, and H. E. Chilcoat, general manager of the Clark Car Co.

The Donner Steel Co. has started shipments on some of its Eastern business by the Erie barge canal.

SOCIAL CLUBS FOR EMPLOYEES

Expense of Undertaking Not Warranted by Results——Reasons for Failure

BY H. S. MITCHELL

When a management contemplates starting a social club for the employees, it finds that housing and installing the equipment requires a very considerable investment, even if the venture is planned on a modest scale.

A dance and assembly floor seems the first and most necessary part of such a plan, and this calls for a large floor area. Since the use of the floor is limited to a few evenings each month, the rental charge is relatively high. The cost would no doubt be less if these dances and assemblies were given in a rented hall. Workmen say that in returning for an evening entertainment to a club built on or adjacent to factory property they experience a feeling of restraint, as if they were still on duty, because of the location.

Private social clubs base their prosperity upon a certain continuity of interest running through their membership. This continuity is apt to be lacking in the diverse elements making up a manufacturing organization, and it is hard to find some pleasurable way to fill this void.

Club Life Opposed to Home Life

Then, too, club life is in many ways diametrically opposed to home life and home making. Attendance at the club means absence from the home, and if this absence occurs too often it is resented by the wife and children. This is seen in the constantly shifting attendance at private clubs. If they prosper these clubs must always be acquiring new members. Since this shifting is just what the factory club would avoid, it follows that when an employee and his family have enjoyed a season or two of club activities, they are likely to withdraw somewhat, if not altogether, from regular attendance. Other interests claim their attention; children come, a home is purchased, or evening studies are started, and if this family remains a part of the organization there is no one to replace them at the club. Hence the experience of having attendance drop off alarmingly, after a year or two. Investigation locates only trivial reasons, thus the management may feel that its efforts and expenditures have not been appreciated. The absentees are not lacking in appreciation and have enjoyed their club experience, but have had enough.

Bowling alleys and pool tables require simple but specialized care in upkeep, of a kind not always available within a factory organization. Depreciation is rapid if this care is not given just when needed, with the result that in factory clubs this equipment is quite often in miserable condition. The supplies and labor incidental to their proper upkeep will absorb a surprising amount of the income from such installations.

Unless the plant is of a size to afford a paid welfare director, some of the salaried help must devote considerable time to planning and arranging the social events. The success of these affairs will be in direct ratio to the care and thought devoted to them, so if they are to be successful the management must wink at the loss from semi-productive effort, of the hours spent in arranging the dances and parties.

If gambling is allowed for even nominal amounts, it will be found an unmitigated evil, that once started can never be stopped. The younger and inexperienced, the ones least able from the size of their incomes, will lose steadily to the older hands at the games.

Active Sports Most Popular

Bowling, baseball, basketball and tennis seem to prosper when entered in competition against other factories, in leagues made up wholly of shop teams, and governed by rules peculiar to the needs of such competition. Inter-shop leagues seldom do as well, because such leagues are often overexpanded and are so unbalanced as to destroy much of the interest.

The annual shop picnic comes during the summer school vacation, and because it meets a real demand of the family for an outing at a reasonable cost, it seems the most successful of all efforts to link the factory and the home.

The workingman has learned to appreciate sanitary toilet arrangements, good drinking water, a restaurant that serves appetizing food. A few of the older men enjoy the allocation of a garden plot. The younger element like to represent the organization in sports. But a club seems to approach so many untried fields that while its success is assured for a short period, its continuous utility is doubtful indeed.

New By-Product Coke Plants

Of the 1228 new by-product ovens completed in the year 1919, 718 were new plants and 510 were extensions of existing plants. The following tables, which were prepared by the Geological Survey, summarize the new ovens built and building, by plants as well as by types:

New By-Product Ovens Completed and Put in Blast in 1919

Company.	Location of Plant.	Number of Ovens.	Type of Ovens.	Date blown in.
New plants:				
International Harvester Co.	South Chicago, Ill.	88	Wilputte	Nov. 13, 1919
Steel & Tube Co. of America	Indiana Harbor, Ind.	120	Semet-Solvay	Aug. 28, 1919
Ford Motor Co.	Detroit	120	Semet-Solvay	Oct. 14-Dec. 6, 1919
Jones & Laughlin Steel Co.	Pittsburgh	240	Koppers	June 18, 1919
Rainey-Wood Coke Co.	Swedeland, Pa.	110	Koppers	Aug. 26, 1919
Providence Gas Co.	Providence, R. I.	40	Koppers	Jan. 28, 1919
Additions to existing plants:				
Tennessee Coal, Iron & R. R. Co.	Fairfield, Ala.	77	Koppers	Dec. 17, 1919
Citizens Gas Co.	Indianapolis	40	Wilputte	Jan. 31, 1919
Indiana Coke & Gas Co.	Terre Haute, Ind.	30	Koppers	Jan. 1, 1919
Bethlehem Steel Corporation	Sparrows Point, Md.	a180	Koppers	Jan. 1, 1919
Seaboard By-Product Coke Co.	Kearny, N. J.	55	Koppers	Jan. 21, 1919
Carnegie Steel Co.	Clairton, Pa.	128	Koppers	June 3-July 1, 1919
Total		1,228		

a—Completed but not put in blast.

By-Product Ovens Under Construction Jan. 1, 1920.

Operator.	Location of Plant.	Number of Ovens.	Type of Oven.	Probable Date of Operation.
Birmingham Coke & By-Products Co.	Birmingham, Ala.	50	Koppers	March 1, 1920
Sloss & Sheffield Steel & Iron Co.	Birmingham, Ala.	120	Semet-Solvay	May 1, 1920
Tennessee Coal, Iron & R. R. Co.	Fairfield, Ala.	77	Koppers	Feb. 1, 1920
St. Louis Coke & Chemcial Co.	Granite City, Ill.	80	Roberts	June 1, 1920
Donner-Union Coke Corporation	South Buffalo, N. Y.	150	Koppers	June 1, 1920
Lackawanna Steel Co.	Lackawanna, N. Y.	60	Semet-Solvay	July 1, 1920
Cambria Steel Co.	Johnstown, Pa.	60	Cambria-Belgian	June, 1920
Jones & Laughlin Steel Co.	Pittsburgh.	60	Koppers	April 1, 1920
Pittsburgh Crucible Steel Co.	Midland, Pa.	100	Koppers	June, 1920
Domestic Coke Corporation	Fairmont, W. Va.	60	Koppers	May 1, 1920
Steel & Tube Co. of America	Mayville, Wis.	36	United-Otto	Jan. 1, 1920
Total		853		

BRITISH STEEL CORPORATION

Progress Being Made in Forming a Great Company in Canada

Events are now shaping themselves rapidly for the consummation of what is declared to be by far the biggest merger that Canada has seen. Representatives of the Dominion Steel Corporation and the Nova Scotia Steel & Coal Co. interests recently met in New York, and a few weeks, it is believed, will see the stage set for a combination of these two great coal and iron concerns under the name of the British Empire Steel Corporation. The Canada Steamship Lines will be brought into the huge merger much earlier than was anticipated, and it is understood that a rough outline of the terms of the combination of the three companies, and, in addition shipbuilding interests, such as Halifax Shipyards, has already been drafted. Reports from St. John indicate that not only the above-mentioned concerns are included in the big merger planned but that several big eastern Canadian companies will possibly be included. Stanley Elkin, representative of the Maritime Nail Co., after his recent conference with Col. Grant Morden, admitted that the representative of the British capitalists has been in communication with a number of other concerns in Eastern Canada engaged in the production of iron and steel products.

Will Attract British Capital

In addition to affecting an amalgamation of the Dominion Steel Corporation and the Nova Scotia Steel & Coal Co., the plans of the British capitalists are now understood to embrace the consolidation of other eastern Canadian plants manufacturing iron and steel into finished products. It is not expected that under the merger the constituent companies will lose their identities, but will be merely fitted with a general scheme of operation, abolishing overlapping of effort, and providing for a steady production of various classes of commodities required by the plans of the new corporation. The consolidation is expected to bring a very large amount of British capital to eastern Canada, and also an army of steel workers. It will also be an important factor in promoting shipping facilities between Canada and Great Britain, for the British interest concerned will require great quantities of steel billets and steel products of all kinds. In association with the British concerns which are financing the project, the new concern, it is said, will be the largest industrial undertaking in the British Empire.

Colonel Morden Before Legislators

The appearance of Col. Grant Morden a few days ago before a gathering of members of the House of Commons and the Senate at Ottawa, Ont., and his graphic unfolding of plans for the development of steel and coal industries of Canada, and combining with them shipping and transportation as necessary links, has served to heighten interest in the projects that he has been developing in this country. He went so far as to declare that plans were now being completed "for the formation of the greatest industrial organization in the British Empire." Further on he indicated that the dream of those behind this enterprise was to create in Canada a fitting rival to the United States Steel Corporation. But this could only be secured by a great combination of the steel resources of Canada and shipping and transportation interests and the finishing mills of Great Britain, with abundance of British capital and experience. Following are some of the most interesting passages taken from his address:

Great Ore and Coal Deposits

"On the Atlantic seaboard of Canada lies the greatest deposit of ore and coal known of in the world to-day. There are over 500,000,000 tons of iron ore, 15 per cent of the total estimated iron ore in the world, lying there; and side by side with it is over 6,500,000,000 tons of coal, all lying at tide water with some of the finest harbors in the world. Consequently, steel should be manufactured there cheaper than in any other part of the world. The geographical location is unique. It sits up over the North Atlantic ocean, it is closer to South America than the United States; closer to South Africa than England; a ferry service could be run across to the Clyde. But what is lacking? Two things—capital and experience! I happened to be associated with some of the largest steel masters in England. I went to them and I said, 'You have your great finishing mills in England, you have your established connections in the markets of the world, but we have in Canada the raw material, and we can make you your slabs and billets much cheaper than you can produce or secure them in any other place.' They agreed, and so have made possible the plans which we are now completing for the formation of the greatest industrial organization in the British Empire."

Bids on Coal Cars Unsatisfactory

WASHINGTON, April 27.—Trade Commissioner C. E. Herring reports from Brussels that the Belgian Railway Administration recently called for bids for the construction of 15,000 steel coal cars, with rather unsatisfactory results. Bids were received from Belgian, American, English, and German manufacturers, but none of them was entirely satisfactory to the Government, although the figures specified by the Belgian concerns most nearly met the requirements. The quotations by the latter were approximately 24,000 francs, while prices named by foreign competitors are said to be in the neighborhood of 35,000 francs. The Government has decided to confer with bidders in a position to furnish the cars, in the hope of obtaining better prices and earlier deliveries, but Belgian manufacturers would find it very difficult to reduce their quotations because of the enormous prices they are compelled to pay for practically all their imported raw materials.

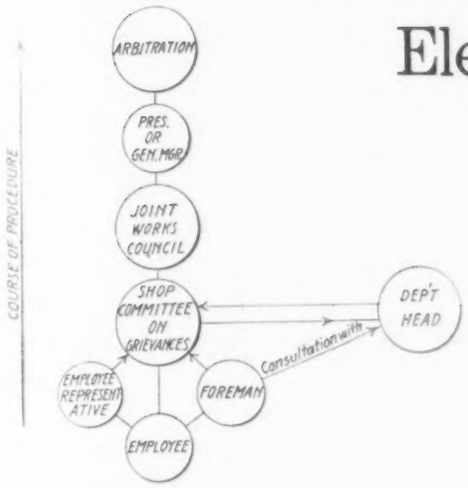
Industrial Relations Association

The Industrial Relations Association of America will hold its second annual convention at the Auditorium Theater, Chicago, on May 19, 20 and 21. The association comprises 45 local associations well distributed geographically from the Atlantic Coast Shipbuilder's Council in the East to the California Association on the Pacific. Among the subjects which will be discussed are: "Community Conditions Affecting Labor Stability," "The Foreman of the Present and the Future," "What Does Labor Want?" "What Does Management Want?" and "Industrial Relations and the Federal Government."

The Federal Electric Co., Chicago, maker of electric signs, industrial sirens, electric household appliances, has moved to its new plant at Eighty-seventh and State streets, that city. Here sufficient ground is available for baseball and tennis grounds for the employees. The company began as a maker of electric signs in 1901, began manufacturing a vacuum cleaner in 1906; put a washing machine on the market in 1912, and now has some eight different commodities produced on a manufacturing scale. John F. Gilchrist is president; James M. Gilchrist, secretary-treasurer; Herbert I. Markham, general manager, and C. B. Graves, sales manager. Samuel Insull, president Commonwealth-Edison Co., is chairman of the board of directors.

The third annual Wisconsin Industrial Service Conference was held in Milwaukee April 26, 27 and 28. Among the speakers were Dr. H. D. Martin, medical director Pollak Steel Co., Cincinnati; Dr. Robert Olsen, United States Public Health Service, and Carl L. Smith, public safety field secretary National Safety Council.

To develop the British steel export trade a series of films showing the steel industries of Sheffield will be shown this year in 86 of the principal cities of Western Europe, America and the British Colonies and Dependencies, according to *Anglo-American Trade* for March.



Elements of Success of Shop Committees*

Freedom from Superimposed Spirit Necessary—Methods of Handling Complaints — General and Specific Functions — Relations to Labor Unions

BY CHARLES MORRIS MILLS

THE shop committee must be free from its very start of any *superimposed spirit.* There should be an educational method of introduction rather than the dumping of any set scheme upon the heads of the employees. It is not enough to have the president make some announcement that there is to be a shop committee plan and then throw the plan out into the shop for acceptance. Rather, preliminary conferences should be held between management and men where the management may "sell" the idea to the men. The next steps may then be the drawing up of the plan separately by the management and the men; conference over the different schemes; the formulation of a definite organization; its presentation to the men; the vote upon the plan; and, finally, the election of representatives.

An interesting sidelight upon the method of induction comes from Bethlehem Shipbuilding Corporation at Sparrows Point, Md. On June 11, 1918, the company received a signed petition from its employees requesting authorization to elect from their number representatives to deal and co-operate with the management in the carrying out of the present shipbuilding program, and to facilitate the ways and means for ready adjustment of all matters arising for settlement. The company considered the proposal and decided, in view of the helpful spirit evidenced by the employees, to accept the suggestion, and accordingly prepared a plan embodying the features asked for by the petitioners. In order that the plan approved by the company would have the support and co-operation of the employees, a general meeting of the department representatives was called on Thursday, June 25, when the plan was accepted and approved.

The best scheme would seem to be to have the plan asked for by the employees. This is difficult. The average group of workers lack initiative for such a proposition. In that case, the seeds of the plan may be silently sown by the management. It is far better than imposing some scheme from above.

Another scheme is the introduction of the shop committee in one section of the plant at a time. If a small department committee is established in a certain part of the plant, the chances are that other sections will become interested and other department committees can be formed of their own accord. Gradually a general shop committee can be evolved. The whole idea is that it must be created sufficiently within the ranks of the employees so that they will regard it as their own and will be loyal to it accordingly.

Handling of Complaints

The course for the adjustment of complaints and grievances should be open, workable and satisfactory to both parties involved. It should take into consideration the attitude underlying the complaint which is more important than the primary complaint. "The fact a man cannot secure action on the complaint, however, causes it to assume an importance in his eyes out of proportion to its real seriousness. His principal grievance is not the original, but the fact that he cannot secure a fair consideration of the original complaint." (Slichter, S. H., The Turnover of Factory Labor.)

The course of procedure is generally from workman to foreman or to representative to department head to joint committee to general manager or arbitration board. (See diagram for procedure.)

Shop committees cannot be founded upon stress and trouble. As Aborn and Shafer write in "Industrial Management" (July, 1919): "The industrial round-table does not need a grievance committee to stir it up." "Works committees," reads a Whitley report, "would fail in the main purpose if they existed only to smooth over grievances."

The function of the shop committee is not only to deal with the negative problem of complaints and grievances, but with all the conditions and problems in the plant. The shop committee is not simply a contentment antidote for plant maladjustments, but is an educational process reaching out into the entire factory community.

Proper Executive Supervision

Many plans have failed because of proper administrative directions. Executives have given too little heed to the type of men that they have chosen to represent the management. Heads of departments may be expert in their line, but have little knowledge of the problems of human life. Men should be chosen who are broad, sympathetic, open to conviction, judicial, yet firm and decisive.

Executives have been in the habit of going too far with shoving responsibility upon the employee representatives. The function of the shop committee is to deal with the problem of the employee in relation to the management, not to discuss managerial problems.

Specific Functions

Previous to the establishment of the shop committee there were problems in the shop that were not covered by the functions of any organization. It is these functions which the shop committee endeavors to perform. It is upon these functions as a base that the shop committee has won the right to its existence in the industrial structure. When it goes beyond these specific functions it ceases to be a shop committee. Trade unionism has failed to discover what those functions are, being interested in other things which it considered more important. Shop committees have seized this particular field of functions, and, so far, have generally made good.

Shop Committees Versus Trade Unions

Shop committees are attacked by organized labor as "employer unions" seeking to undermine the sacred principles of unionism. In the last convention of the American Federation of Labor the following resolutions were passed:

Whereas, In view of foregoing facts, it is evident that company unions are unqualified to represent the interests of the workers and that they are a delusion and a snare set up by companies for the express purpose of deluding the workers into the belief that they have some protection and thus have no need for trade union organization, therefore be it

*Continued from last week.

Resolved, That we heartily condemn all such company unions and advise our membership to have nothing to do with them, and be it further

Resolved, That we demand the right to bargain collectively through the only kind of organization fitted for the purpose, the trade union, and that we stand together loyally until this right is conceded us.

Seeing that this is a recorded attitude of organized labor at present we must further face the facts and ask ourselves these questions: (1) Is the shop committee a substitute for the union? (2) Is the shop committee a device of capital to stave off unionism? (3) Does the shop committee encourage or discourage unionism?

Shop Committee as a Substitute for Unions

In answer to this question we must first find out what are the functions, respectively, first, of the shop commiteee, and, second, of the union.

The function of the shop committee is to present a thoroughly democratic internal plan of government in the individual plant by means of which employees, individually and collectively, may have a direct and authoritative voice in the formulation of such policies as directly affect their physical, moral, social and economic welfare. In other words, it is a representative form of government consisting of management and men met together for legislation, formulation and construction. It meets for conference, discussion, exchange of opinion—a forum of expression. Carried further, it is an educative process for both capital and labor. It educates the employer to gain the point of view of the wage-earner, to show him the problems that the worker is up against. It educates the worker in showing him not only condit.ons of the shop and his relation to them, but also the problems of management, production, sales and finance, and the responsibilities involved thereby. Ideally, it points the way and means by which labor can finally know something of the means of control in part of production, and how it can finally take its rightful share in business.

The function of trade unionism, generally speaking, is the protection and furtherance of the aims of the wage-earner. It collects men into specified groups and shuts the door on other groups. It gathers these men into groups for the purpose of collective action and for the furtherance of collective action it says that all wage-earners in that group are of equal ability. The main function of collective action is collective bargaining, the purpose of which is to strike the best contract with the employer or group of employers. The basic purpose of the union is to make the most advantageous bargain; to make the best possible business transaction. Inherently trade unionism is militant; it is combative; it stoops to discussion only on a collective bargaining basis. Educationally speaking, it is restrictive. Its leaders know the ways and means of bargaining, but by its very nature it cannot train men who are its members in the ways and means of industrial processes and functions of business.

Is, then, the shop committee a substitute for the union? We answer, no, not any more than the union is a substitute for the shop committee. It is not a question of whether the shop committee is a substitute for the union, but rather whether the shop committee and the unions do not have separate functions to perform. Shop committees and unions at the present stage of development are not antagonistic; rather they run on separate tracks, ever reaching toward different goals. *To-day* shop committees are representative of democratization and education within the plant; trade unionism stands for collective bargaining of workers who may or may not be fully represented within the plant involved. Shop committees and unions correlate rather than conflict.

Is it a Device of Capital?

The shop committee as a device of capital to stave off unionism. The shop committee, rightfully functioning, has at present no direct relation to unionism, except in plants where they coincide. In that case there is no conflict as in the Hart, Schaffner & Marx Co. of Chicago. The shop committee is only a device to stave off unionism where employers deliberately choose to do so. It becomes, then, a union defeatist movement, and if employers take that attitude nothing but complete disaster awaits them. The shop committee is only "the last stand of a weakened and wornout Capitalism" when employers seek to make them instruments of repression rather than expression.

Does the shop committee encourage or discourage unionism? The answer is: the shop committee encourages good unionism and discourages bad unionism. Where unionism has been true to her real principles there shop committees help unionism. Shop committees discourage a unionism which is blatant, headstrong, poorly led, defiant. If a company shows a system of shop representation which is sincerely representative and democratic, then that group of workers will forsake a bad local union and rally to the flag of the company union.

Shop committees and trade unions are not antagonistic. Each has something to give the other. Shop committees must be rooted and grounded in the spirit of the best of unionism; trade unions need the educational insight of the shop committee. When the two systems can learn to live together then there is some faint hope of industrial peace.

This discussion has been made in the light of present day industrialism. As long as the great basis of action between capital and labor is collective bargaining, collective bargaining in some form must exist. At present the shop committee is unquestionably limited in its function of collective action. The management still has the upper hand. But the curb is on the shop committee in that direction. When it is removed it is doubtful whether the inherent purpose of the union will continue to exist. The worker will then feel that it is possible to bargain collectively without the aid of some outside agent and the outside responsibility of absentee bossism will cease to exist. A further discussion along this line will be taken up under the topic "Safeguards of Shop Representation."

Relation to Unorganized Labor

There is no question that the shop committee of the right character will have tremendous effect upon the large mass of unorganized labor. If a shop committee, properly functioning, succeeds in a plant or plants, there will be established a factory solidarity, an esprit de corps, a spirit which will be of far reaching results. The worker will be led to see that the management is composed of "white men" and that there are few monsters or murderers among them. They will see that co-operation is better than competition; and that there is a way to obtain their just rights without submitting to an outsider's influence.

In due time they will choose the shop committee in preference to the union, provided that the shop committee offers all that unionism does and something more. When the hour of decision comes they will choose the shop committee because they want home rule rather than outside domination. But if the shop committee is unrepresentative or autocratic, nothing will drive the worker to the union faster. When it offers less than the union the worker will go to the union.

It is this bid for unorganized labor which will bring much of the conflict in the future, and the decision of the worker will go to that organization which is the fairest, the most representative, and the most attractive to him. In time, in the evolution growing out of strike and turmoil, it will be proven that there is a place for both the shop committee and union, for they have separate duties to perform; but in this period of change the decision of the unorganized group will go far to delay or to speed up the final results.

(To be continued)

In pursuance of the plan of making the McKinley Memorial Building in Niles, Ohio, a memorial not only to President McKinley but to industrial leaders as well, a bronze bust of the late Frank H. Buhl, of Sharon, Pa., was recently installed. For many years Mr. Buhl was a leader in the iron and steel industry at Sharon and was beloved for his gifts to the city.

FATIGUE AND ACCIDENTS

Effect on Production—Distribution of Accidents —Differences Between Fatigue and Tiredness

Fatigue and its effect on production is discussed in an article by A. Vautrin, published in *Technik and Wirtschaft* and of which a digest is given in the April issue of the *Journal* of the American Society of Mechanical Engineers. The article discusses the nature of fatigue, its form and degree and influence on productivity of labor, accidents, etc., and a distinction is established between fatigue as an objective phenomenon and the subjective feeling of fatigue, or tiredness.

The writer explains that it has been known for some time and experimentally established by Kraeplin that all work done by man, whether physical or mental, is accompanied by a series of reactions which either favor its continuation or oppose it. The most important of the reactions opposing the tendency to continue working is known as fatigue, and may be of a physical or mental character or a combination of the two.

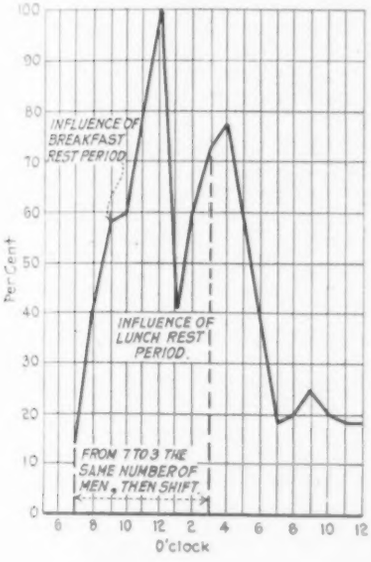
As regards its physical nature, it appears that all work produces in the body substances (chemical or organic) which exert gradually a narcotic effect on the central organs of the nervous system. In fact, Weichhardt claims to have found present in animals a poison produced by fatigue which he calls kenotoxin.

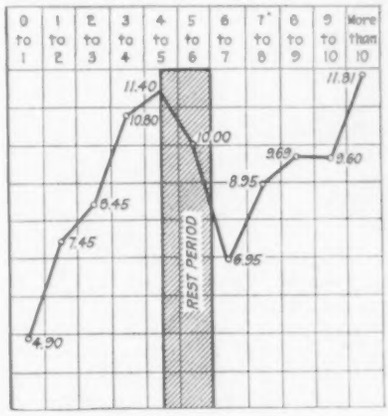
Fatigue may be either physical or mental. In physical work certain groups of muscles are set in action, thereby producing a corresponding excitation in the central nervous system. Muscular fatigue takes place, therefore, partly on the muscular periphery and partly at the brain center, and the more demand is made on the brain center, the greater the final fatigue. Purely mental work creates a demand on the large brain, which means a gradual exhaustion of the gray matter and a certain demand on the nervous ganglia connected therewith. In either case, however, sooner or later exhaustion of the organs brought into action follows.

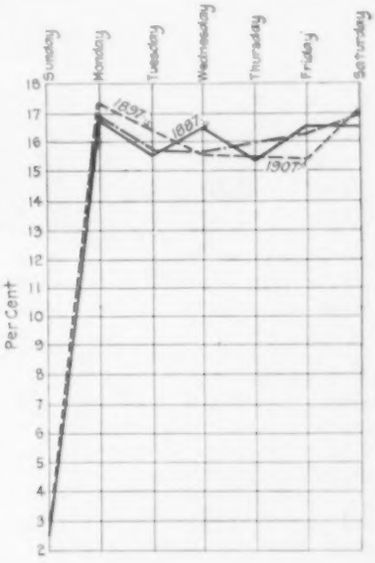
Moreover, there is a close connection between physical and mental fatigue, and it is a well-known fact that when the body is overtired for any considerable length of time, this also reduces the ability of the brain to do mental work. The reason for this is clear. All work may be physiologically considered as a process of consumption which calls into play not only the organs directly producing the work, but, more or less, all the energy reserves of the body. Hence bodily exhaustion will gradually lead also to mental exhaustion, and an overburdening of one part of the body by products of fatigue will necessarily sooner or later affect the operating ability of all the other parts of the body.

Fatigue is only a moderate degree of the lowering of the producing ability of the body due to exhaustive work. A greater degree thereof is known as exhaustion, and the difference between the two is stated as follows: Fatigue leads to the lowering of the ability to perform work; exhaustion represents a state at which the performance of work becomes entirely impossible. Physiologically, exhaustion represents such an accumulation of the products of fatigue that the body is unable to reconstruct itself for the time being.

A clear difference must be made between fatigue, which is an objective phenomenon and represents the actual failing in the ability to perform work, and the subjective feeling of fatigue, namely, tiredness. Whereas fatigue is produced by the actual physiological processes of exchange of materials in the body, tiredness may be the result of various conditions and circumstances often lying entirely outside of the effort to produce work. Fatigue is a physiological phenomenon; tiredness, psychological. It may be due to lack of interest in the work performed, outside happenings in the life of the workman, etc.


INFLUENCE OF BREAKFAST REST PERIOD
INFLUENCE OF LUNCH REST PERIOD
FROM 7 TO 3 THE SAME NUMBER OF MEN, THEN SHIFT
Per Cent
O'clock





The Distribution of Accidents in the Chemical Industry During the Working Day in the Years 1897 to 1907 Is Shown in the Chart Above. At the left, distribution of accidents in a German cable factory throughout the working day; at the right, frequency of accidents in the various days of the week computed per 100 injured or killed

The degree of tiredness depends mainly on the condition of the workman, and the same amount of effort will produce a greater tiredness in a weak man than in a strong man, in a man poorly nourished, than in one well nourished, and in boys and women than in grown-up men.

The paper presents a number of facts in confirmation of the claim often brought out before that there is a distinct connection between fatigue and accidents, although the author makes it clear that he does not consider accidents as being due to fatigue exclusively.

From his data it would appear that in the hours when the fatigue of the workman is still slight there are scarcely any accidents, while in the sections of the working day or week, when the fatigue has grown to an appreciable extent, the number of accidents is more than double the average.

The following statistics were collected in Lower Frankonia in 1895:

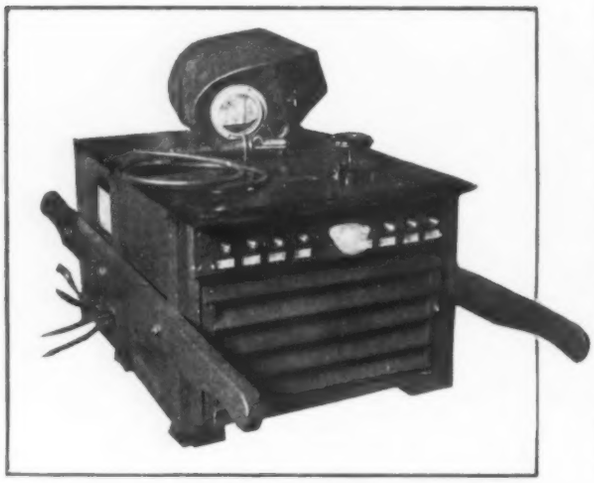
Length of working day, hours....	9½	10½	13	over 13
Accidents per 100 workmen.....	1.1	2.0	13.2	17.0

The accompanying diagrams, together with tabular data in the article, would indicate that interruption of the working day by rest periods reduces accidents very materially, and that of all the days of the week, Saturday, the day when fatigue is at its climax, is the worst day from the point of view of accident occurrence. This is particularly apparent in plants which do not employ the Saturday half-holiday.

Frederick H. Payne, president Greenfield Tap & Die Corporation, Greenfield, Mass., at the last meeting of the corporation's engineering club, announced that a new building for social activities is to be erected.

Electric Arc Welding Apparatus

Improvements have been made in the apparatus used for cutting and welding of metals by the electric arc using alternating current, described in THE IRON AGE, issue of Sept. 12, 1918, page 625, and manufactured by the Electric Arc Cutting & Welding Co., 222 Halsey Street, Newark, N. J. A means for controlling the length of the arc is now provided, this control being in the hands of the foreman, in that the means of control is removable when set. Another improvement includes a safety device which automatically limits the voltage to 30 when welding or cutting, makes the



Alternating Current Electric Arc Welding Machine Redesigned to Provide for Controlling Length of the Arc

machine practically dead when not in use and cuts the voltage to zero on short circuit.

In order to make the machine more practical for outdoor use or for use in dusty and dirty places, such as foundries, the top of the machine is covered with a solid piece, the terminal plugs now being brought out on the front face under the roof extension instead of on top as in the original design. Baffle plate louvers at each end of the box are provided to exclude rain.

The apparatus is built for the ordinary primary voltages as well as the standard secondary systems. Portability is emphasized as a feature as the machine can be carried directly to the point where the work is to be done and the expense of wiring consequently reduced.

Stock for Employees

The Trumbull Steel Co. at Warren, Ohio, is the first of the larger independents in the Mahoning Valley to announce a plan for sale of common stock to employees. Directors have called a special stockholders' meeting for May 18 to increase the authorized common capital stock from $14,000,000 to $25,000,000, the increase to consist of 110,000 shares with par value of $100; to increase the board of directors from five to seven and to set aside 20,000 shares, par value $2,000,000, of the common capital stock for subscription by employees "in such amounts, upon such terms and at such times as may be deemed advisable by the board of directors." Such stock will be sold at not less than par, states President Jonathan Warner. The policy of offering stock to workers "is being very widely adopted by the most substantial companies in all lines of industry and has become an accomplished practice well beyond the experimental stage," he adds. "In my opinion the company will be in a much stronger position if a large proportion of its employees have a direct financial interest in its prosperity and growth."

Capital increase predicates a common stock dividend. The increase has been recommended, states Mr. Warner, "primarily because the board of directors is of the opinion that some distribution of the surplus of the company should be made in the form of a stock dividend to the common stockholders."

It is expected that both the Youngstown Sheet & Tube Co. and the Brier Hill Steel Co. will also announce plans to sell stock to employees. All three companies are planning common stock dividends and one of the chief reasons for such distributions is that they will provide a vehicle for disposal of stock to employees, by permitting the issuance of additional stock and consequently reducing the market price per share. Directors of both companies considered such distributions at meetings last week, but were not prepared to announce their conclusions.

Reorganization of Franklin Moore Co.

At a recent meeting of the stockholders of the Franklin Moore Co., Winsted, Conn., manufacturers of hoisting machinery, the following officers and directors were elected: J. B. Adams, president; W. A. Battey, vice president; W. C. Briggs, vice president; J. H. Whiting, treasurer; C. S. Moore, assistant treasurer; A. E. Moore, secretary, and G. W. Borton. The company, which was organized in 1866, for the manufacture of high-grade carriage bolts, has since developed an extensive line of hoisting apparatus including chain blocks, hand cranes, trolleys, electric hoists and electric cranes. In the past these products have been principally absorbed by the large manufacturing plants in New England and the East, but with increased facilities and organization, this equipment will be more widely distributed through branch offices located in some of the larger American cities and by export connections.

Mr. Battey, Mr. Briggs and Mr. Borton, the new members of the organization, have long been identified with the manufacture and sale of material handling machinery, and have a wide acquaintance among users in the Eastern and Central States. Mr. Briggs has been placed in charge of the works at Winsted, but will continue the study of material handling problems and the application of mechanical handling devices in the many industries in which they can be successfully employed.

Steel Jackets and Bands for Use With Snap Flasks

The steel jacket and band shown in the accompanying illustrations for use with snap flasks are manufactured by the Adams Co., Dubuque, Iowa. After the flask is removed, the jacket, or stripper, is shoved down over the mold to prevent its bursting while being poured. No. 10 gage steel is used in constructing the jacket. The corners are reinforced with angle irons

Steel Band to Be Placed Inside the Snap Flask Before the Mold Is Made

Steel Jacket Which Is Shoved Down Over the Mold to Prevent Its Bursting While Being Poured

which are electrically spot welded as are the angle irons on the ends, and the channel iron on the sides. The jackets are made to any size desired, either straight or tapered. The accuracy with which they are made, it is explained, assures even pressure on all sides of the mold, thus to minimize run-out troubles and reduce molding costs.

The bands are of No. 10 gage steel, spot welded, and are to be slipped inside of the snap flask before the mold is made, and in either cope or drag depending upon which part of the mold is likely to burst out. The bands are 3/16 in. smaller in length and width than the inside of the flask.

A German League to Govern Iron Trade

Producers, Consumers and Workmen All Represented—Object Is to Prevent Strikes at the Expense of the Home Market

(*Special Correspondence*)

BERLIN, April 10.—The Government's plan for organizing a so-called self-governing body for the iron trade has at last taken practical shape. The Reichsrat, which is the present name for the overhauled Bundesrat, has recently adopted the plan submitted to it, and it has been passed on to the Economic Committee of the National Assembly, which is understood to be in substantial agreement with its provisions.

The scheme provides for the organization of the "Eisenwirtschaftsbund", or "Iron Business League", and it will have its head office at Duesseldorf. The league will divide its work into two divisions—the first for pig iron, ferromanganese and old material, and the second for semi-finished steel, structural forms, railroad track supplies, bars, wire rods, plates, malleable tubing and materials for railroad rolling stock. The Economic Minister is authorized, in agreement with the league's management, to extend or to restrict these lists. If the Economic Minister and the league cannot reach an understanding, disagreements will be decided by the Cabinet, after hearing the advice of the National Economic Council, or one of its committees. This council is to be organized soon, to have a function as expert adviser to the Government on all business matters.

Producers and Consumers in the League

The league is to be composed of 70 members, producers to have 34, consumers 24 and traders 12. In each of these groups one-half of the members will represent employers and the other half workmen and other employees. The general meeting of the league will organize various committees for carrying on its work. For the present the following committees are proposed: 1. On home trade in pig iron, ferromanganese, ferrosilicon and scrap. 2. On home trade in steel and rolling mill products. 3. On foreign trade. The existing agency controlling foreign sales will be taken over by the league later.

The most important tasks of the league are declared to be to guarantee supplies for home consumption, to regulate and promote exports, and to regulate the trade in scrap. In order to ensure the satisfaction of the more urgent home demands all works will be obligated to set aside a certain percentage of their production, fixed by the league, to be held at the disposition of home consumers, and this percentage is to take precedence over other obligations of the works, even including their own requirements. The Economic Minister, after taking counsel with the league, will fix the amounts of each class of goods to be reckoned as a part of this urgent home demand.

Government May Seize Material to Meet Home Demand

So-called delivery pools for supplying this urgent demand are to be organized among the various works, covering all goods except waste and scrap. Penalties will be provided at a fixed rate per ton on goods not delivered. The Economic Minister can even confiscate products (except waste and scrap) with which to meet this urgent home demand. It can be easily understood that this provision is by no means relished by manufacturers; they wanted to restrict this right of confiscation to supplies in the hands of dealers or consumers. The great works also wanted to devote only a part of their output to covering this urgent demand before filling foreign orders. Their proposal was regarded as likely to jeopardize home interests, for the high prices now prevailing in foreign markets provide such a stimulus for the export trade that there is real danger that even the most necessary home requirements will not be covered.

The regulation of home prices will be made by the Economic Minister, who will name the maximum prices. He will also stipulate the amounts of each class of products that may be exported after taking counsel with the league. In the same way will be determined what products and finished goods shall be sold to create foreign exchange for meeting payments for ores and other supplies of raw materials. The Economic Minister will also be authorized to have control over the imports of scrap, pig iron, crude steel and rolling mill products in order to guarantee that the cheaper goods supplied to home consumers by German works shall not be sold in the open market under the name of foreign goods.

It is intended to regulate and control the market in scrap in such a way as to facilitate the equitable distribution of the supplies coming upon the market and to restrict their prices to a figure fixed by the Economic Minister. These prices will be based upon the price of best steel turnings, which will themselves have a fixed relation to the price of Siegerland steel-making iron. Scrap can even be confiscated if this should appear to be necessary for supplying the great works with material. It is added, however, that these provisions are not intended as amounting to a complete control over the scrap market, but only as empowering the Economic Minister to act in case of necessity after hearing the views of the league.

It is understood that as soon as the league begins its existence the order for the compulsory prolongation of the steel works association will be canceled.

Uprisings Hurt Iron Industry Seriously

Work in the iron trade has naturally been much disturbed by the crazy political events of the past three weeks and the resulting conditions of semi-anarchy in the great Rhenish-Westphalian region. These troubles set in right at a time when the prospects of business had begun to improve perceptibly and when foreign countries were beginning to have greater confidence in the stability of conditions here. The coal trade had reached a level of production not known since the war ceased; shipments in the Rhenish-Westphalian districts averaged about 25,000 carloads a day just before these latest troubles began, whereas they hardly ever exceeded 15,000 last autumn.

Work went on to some extent during the greater part of the past three weeks, but such a state of terrorism existed in important centers like Essen, Dortmund, Bochum, Duisburg and Muehlheim that little could be done. While there is now a fairly good prospect that the region will soon be pacified, it will probably be several weeks till production returns to its former volume. This seems all the more likely inasmuch as there will be disagreements to adjust between the companies and the men. In fact, the wave of communistic madness that swept over the iron and coal district warrants decidedly pessimistic views as to further developments in the relations of capital and labor. Iron men were already deeply concerned in that regard through the adoption in December of the law for the formation of shop councils in all establishments, with far-reaching powers of dictation and even representation on boards of directors by the workmen. It is feared that the councils will fall into the hands of political agitators more concerned about wresting political advantage out of their positions than in using them for promoting the economic and producing capacity of the works.

Prices Still Advancing, But Scrap Reacts

The movement of prices is still upward, with the exception of waste and scrap. The Pig Iron Associa-

tion has just raised prices as follows: hematite to 2,288.50 marks, foundry to 1,775 marks, Siegerland steel-making qualities to 1,440 to 1,455 marks. At the same time the Ore Syndicate raised crude ores 13.50 marks to 212.60, and roasted ores 20.10 marks to 318.50 per ton. The prices adopted for export about four weeks ago were also higher, being as follows for structural forms, bands, bars and universal shapes: for Holland, 240 to 290 gulden; Sweden, 450 to 525 crowns; Norway, 480 to 555 crowns; Denmark, 550 to 625 crowns; Switzerland and Italy, 550 to 650 francs. From Luxemburg comes news that foundry No. 3 has been raised from 650 to 1,000 francs, delivered at the frontier.

The reaction in old material was mentioned in my last report, there having been a fall of 300 or 400 marks from the high-water mark. The reaction continued till the price dropped to 1,800 marks. This fall has an interesting cause. So great had been the scarcity of raw materials that the works had adopted the practice of demanding part payment in scrap for all finished products, and this had caused a greatly intensified demand and much speculation in the former. It is now mentioned that prices were driven even as high as 2,800 and even 3,500 marks per ton. Then manufacturers changed their system of payment for finished products, demanding instead of scrap the payment of half of the amount in foreign exchange, as mentioned in my last report. This caused a relaxation in the demand for scrap; and at the same time not a few dealers, holding considerable stocks by means of bank credits, were pressed by the banks to reduce these credits and so had to sell. The high prices previously prevailing had also begun to attract scrap from Holland, a movement due to the fact that German prices had exceeded those of the world's markets. The changes here mentioned caused a considerable relaxation of the demand for scrap.

There will now probably be another all-around advance of steel prices due to a new advance of coal prices by 20 marks. As the Steel Works Association has a rule that every advance of coal by one mark must involve a rise of 3.50 marks in steel, the latter must now be marked up by 70 marks again, though no announcement of that change has yet been made.

Steel Must Be Paid for in Part in Foreign Money

While the changes in prices within a month have been apparently kept within rather narrow limits, the actual change has been much greater. The enforcement of the practice, mentioned in my last report, of requiring part payment even on home orders in foreign exchange amounts to a big advance of home prices. It is now the rule to demand from home consumers at least half-payment in foreign exchange; and one important concern is mentioned that demands as much as 70 per cent. Now, as the actual rates of foreign exchange are considerably higher than the listed prices of the association to foreign countries, the domestic buyers of steel find prices much higher than they were. In fact, the general run of reports from the trade indicates that listed prices are only nominal, and that far higher prices are being paid, especially where goods can be had upon quick delivery. This is particularly the case with bars, which are listed at a maximum of 2650 marks, but buyers are freely paying 3000 marks and even more.

Upper Silesia Fears Crippling from Lack of Swedish Ore.

The demand that Germany deliver up all its ships of over 100 tons and half of those between 1000 and 1600 tons to the Entente causes great concern in the Upper Silesian district, where more than one-third of the ores consumed before the war was drawn from Sweden. It is feared that a considerable part of the furnaces there will have to blow out, as the stock of home ores is insufficient to keep them in operation.

It had been planned by the Bar Association to discontinue its export selling agency at the beginning of March, but the Peiner Walzwerke, of Peine near Hanover protested against its discontinuance. Hence it has been prolonged.

In my last report I mentioned that French capitalists had acquired a large interest in the Halberger Huette in the Saar district. It now turns out that their holdings reach 60 per cent. This concern had hitherto been controlled by the von Stumm family. It is now reported that 60 per cent of the original von Stumm works at Neunkirchen has also been acquired by those interests, besides 4 per cent of the Stumm concern at Homburg in the Palatinate. The von Stumms appear, after loosening their hold in the Saar, to be casting about for a foothold in the Rhenish-Westphalian district. It is reported that they have acquired a controlling interest in the Gelsenkirchener Gusstahl und Eisenwerke—which must not be confused with the great Gelsenkirchener Bergwerk Co.

Phoenix Interests to Build a Blast Furnace in Holland

The merchant firm of Otto Wolff of Cologne, previously mentioned in this correspondence as having acquired large holdings in the Phoenix Co., co-operated, as now transpires, with a Dutch firm, the Koninklijke Nederlandsche Hoogovensen Staalfabrieken of The Hague. Both firms are to be given representation on the Phoenix board at its next meeting in proportion to their big holdings. An interesting development out of these transactions is that the two concerns, with the assistance of Phoenix, will establish a furnace plant in Holland.

Exporter Buys British Government Surplus

A deal involving a minimum of £5,000,000 sterling has been made by Rownson Drew & Clydesdale, Ltd., London, with the British Ministry of Munitions, by which a large part of the surplus war material at 500 or more depots in the United Kingdom is taken over for resale to domestic and export buyers. The terms of purchase include all stores becoming available within the next twelve months. While the first payment is £5,000,000, the price will be based upon the receipts of the material at resale. Included in this purchase are railroad supplies, steel, plumbers' goods, building material, aeroplane fittings, chains, wire rope and general hardware. There are about 2,000,000 horseshoes, 2,000,000 mule shoes, 1,000,000 bolts, 250,000 shovels, 250,000 chisels and several thousand tons of nails. This material will be offered to the manufacturing districts of the United Kingdom and later to buyers in export markets. Sales in the United States will be in charge of the New York office of Rownson, Drew & Clydesdale, Ltd., 80 Wall Street.

Commission Exceeds Authority

WASHINGTON, April 27.—Industries of the country which have objected to the making of monthly reports recently requested by the Federal Trade Commission in what is known as "continuing investigations" are not likely to be burdened along this line further. Those who have studied the decision rendered by Justice Bailey of the Supreme Court of the District of Columbia last week in the case of the Maynard Coal Co., believe it is of such a far reaching nature as to apply to iron and steel and ore producers who, as well as coal operators, have been furnished questionnaires with a view to ascertaining costs of production. It is assumed that a final ruling will be sought from the Supreme Court of the United States.

In his decision Justice Bailey held that the Federal Trade Commission had exceeded its authority because Congress can not compel the production of information in respect to matters over which the Federal Government has no control.

The Baker R & L Co., Cleveland, manufacturer of electric industrial tractors and trucks, has received official notification of citation by the U. S. War Department for "special effort in rendering valuable service by prompt execution of orders and intelligent co-operation."

Metallurgical Courses for Automobile Field

Shop Courses in Foundry, Forging, Heat Treating and Similar Work Established by Michigan Agricultural College

BY H. B. DIRKS*

TO meet the demand for technically trained men in the foundry, heat-treating plants and laboratories of the automotive and other industries, the Michigan Agricultural College, East Lansing, Mich., provides courses in foundry and steel treating based upon the metallurgical aspects of founding and steel treating. These are for students in mechanical engineering.

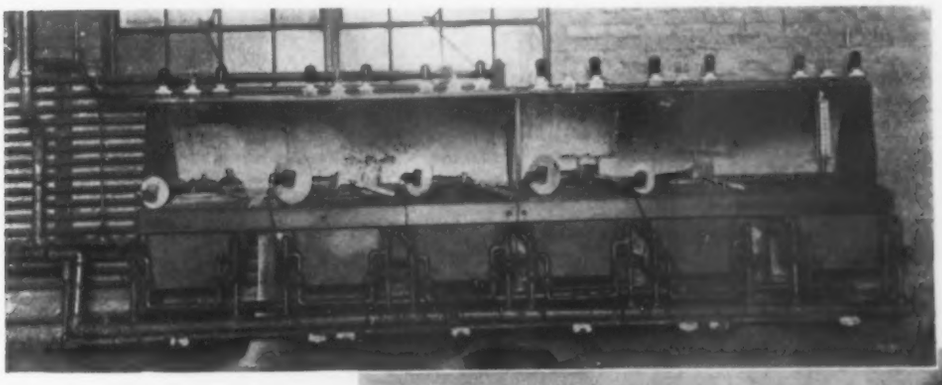
Courses in the Sophomore Year

In the sophomore year, which is divided into three terms of about 12 weeks each, the students receive instruction as follows:

Fall Term.—Four hours per week in the foundry and four hours per week in the forge shop. The foundry work is practical work in hand and machine molding, melting, pouring, cleaning and trimming castings in iron, brass, bronze and aluminum and in core making. The forge work is practical work in forging and welding iron and steel, hardening and tempering steel for hand and machine tools, Both of these course are in charge of instructors who have learned their respective trades.

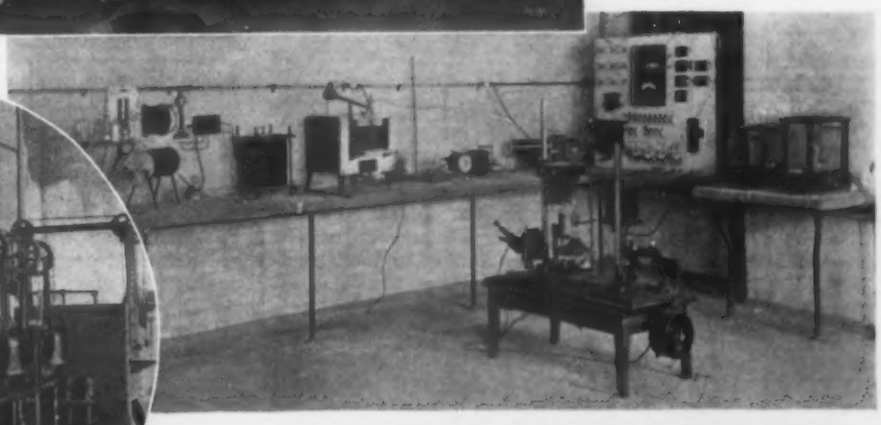
Winter Term.—Four hours per week in the foundry and two recitations per week in the class room. The foundry work emphasizes commercial methods and gives special attention to mixtures, especially for cast iron. The students learn by experiment and study of the cupola, pig iron, scrap, flux and alloys to make a melt which will produce a predetermined analysis or grade of castings. The recitations cover the manufacture of pig iron and the principles of founding. Lectures set forth the special problems of brass and aluminum and direct the attention of the student to the practical applications of theory and accumulated

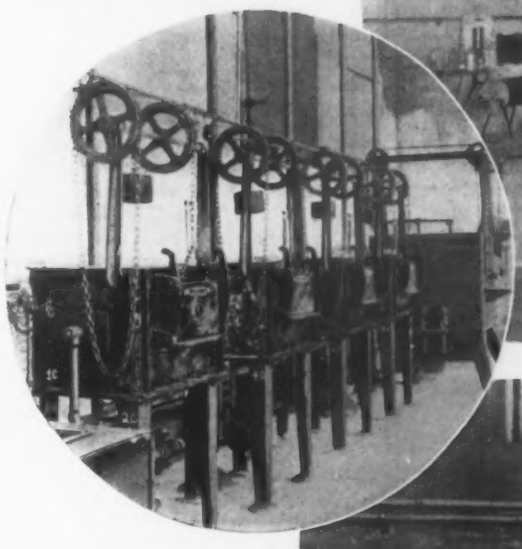
*Professor of mechanical engineering, Michigan Agricultural College.

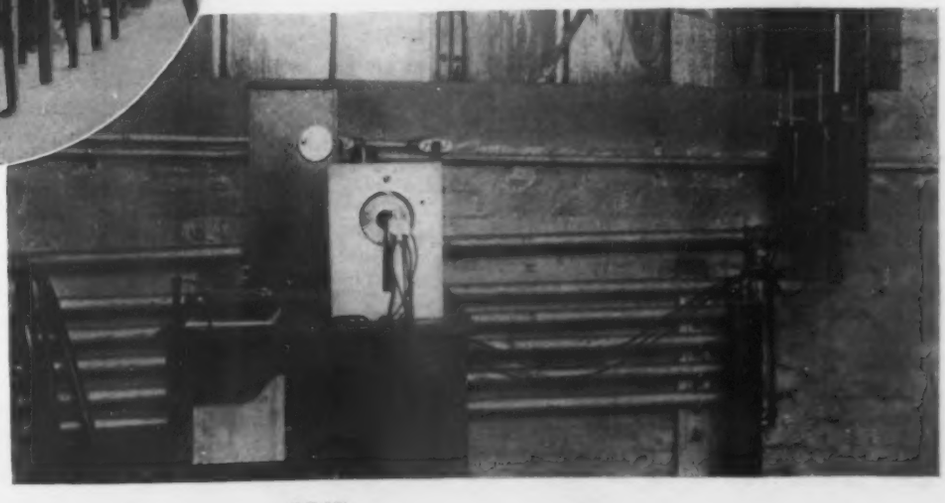


Cyanide Pots, Lead Pots and Tempering Baths

Below, a Corner of the Metallography Laboratory







Leeds & Northrup Critical Point Apparatus

In the Circle, a Part of the Furnace Equipment

knowledge. Moldenke's "Principles of Iron Founding" is used as a text and visits of inspection are made to the foundries of Lansing.

Spring Term.—The work of this term is devoted to the heat treatment of plain carbon steel and instruction is given in four hours of laboratory and two recitations per week. The student experiments in hardening, tempering, annealing and case-hardening and gets experience in hardness testing and temperature measurement. Recitations and lectures cover the manufacture of steel and the heat treatment of plain carbon steel. Visits of inspection to the automobile factories of Lansing supplement the instruction. Bullen's "Steel and Its Heat Treatment" is the text book used.

The classroom and other technical instruction of the courses, as well as the supervision of the practical work, is in the hands of a technically trained man who has been "through the mill" of the practical side of the subjects.

Electrical engineering students take the courses also, but the practical and classroom work is given a "slant" toward the materials used in electrical practice.

Work of the Senior Year

In the senior year, mechanical engineering students who are especially interested in automotive and industrial engineering are given advanced work as follows:

Fall Term.—Advanced heat treatment of steel, supplementing the work of the sophomore year. A study of the heat treatment of alloy steels, including high speed steel, by means of one recitation and four hours of laboratory per week. Specifications of physical properties, chemical analysis and heat treatment are made for every metal part of the automobile. Forgings of all the important parts of the automobile are heat treated and test pieces cut and tested to check the physical properties. The machining properties as affected by heat treatment are indicated.

The forging and heat treating of high speed steels are practised and results observed by their use in the shop under various conditions.

Bullen's "Steel and Its Heat Treatment," collateral reading and inspection trips are used to supplement the instruction.

Winter Term.—Four hours per week in the laboratory and one recitation per week in metallography or the study of the microstructure of metals.

Studies are made of annealed steel of various carbon contents, of hardened and tempered steel and the impurities occurring therein, as well as of the technique of metallography as applied in practical work. Sauveur's "Metallography and Heat Treatment of Iron and Steel" is the text, and inspection trips to factory laboratories are utilized.

Spring Term.—Ten to 16 hours per week may be devoted by the interested student to the study of problems of current interest to manufactures of steel products, the aim being by proper direction and correlation of the work of the student to contribute something to the solution of those problems.

The equipment for carrying on this work is very similar to that in practice except that since the shops are operated as laboratories they contain more laboratory apparatus than a shop or foundry in practice. The forge shop includes 40 down draft forges, shears, grinding wheels, buffing wheels and a set of tools for all students; eleven heat-treating furnaces of various sizes, several lead pots, cyanide pots and tempering baths, Leeds & Northrup pyrometer equipment, including a transformation point apparatus; several makes of pyrometers and the equipment necessary to accurately calibrate them. For hardness testing several scleroscopes and an Alpa Brinell machine are used.

For metallography, Bausch & Lomb microscopes and cameras are used. In addition to them there are several polishing stands, electric furnaces with pyrometer equipment and a dark room.

The foundry equipment consists of one cupola, two gas-fired crucible furnaces for brass and aluminum, a core oven, several molding machines, flasks, and a complete set of molding tools for each student.

Credit is due Prof. J. A. Polson, formerly head of the mechanical engineering department, for realizing and suggesting the courses. The development of this work has been due to Prof. W. G. Hildorf, who is at present in charge of all the work except that in metallography, which is in direct charge of Prof. H. L. Publow of the chemical engineering department.

Humphrey Coal & Coke Co. Organized

The Humphrey Coal & Coke Co. has been organized as a subsidiary of the American Radiator Co., Buffalo, to operate this property, recently purchased from the J. H. Hillman & Sons, consisting of Humphrey coke ovens near Greensburg, Westmoreland County, Pa., in the old Connellsville region, and the officers of the new company are are as follows: A. A. Landon, president, Buffalo; E. F. Fitch, vice-president, Buffalo; W. H. Hill, treasurer, Chicago; W. D. Freyburger, secretary, Chicago; A. B. Kelley, assistant treasurer and general manager, Greensburg, Pa. The coke produced at this plant will be used largely by the American Radiator Co. in its operations.

A. Milne & Co. Builds Chicago Warehouse

A. Milne & Co., New York and Boston, are building a new warehouse at 17-19-21 North May Street, Chicago, which will enable them to carry a larger stock of tool and mining drill steel in that city and to give better warehouse service to their customers in the Middle West. In 1915, this firm opened a small warehouse at 550 Washington Boulevard. The new warehouse is of brick, 50 ft. x 115 ft., with the offices on the second floor, thereby securing full use of the ground floor for warehousing purposes. The light tool steel bars will be racked vertically on one side of the building, while the heavier tool steel and long drill steel bars will be laid on the floor on the other side, leaving the central aisle free, except for a track scale running the full length of the building. This central aisle is wide enough for a truck to drive through from May Street, in front, to the alley in the rear of the building, which facilitates loading and unloading. The warehouse will be ready for occupancy about May 1.

Plant Sold by the Government

The large Park plant, built by the Government at Baltimore for the use of the Bartlett-Hayward Co., of that city, for the manufacture of shrapnel bullets during the war, has been sold by the Government to the General Electric Co., Schenectady, N. Y., at a price said to be in excess of $600,000. The actual price will not be made known by the Ordnance Salvage Board, Washington, for about a month, when the transfer is actually made.

It is understood that the General Electric Co. will use the plant for the manufacture of electric switchboards and switchboard accessories. The plant consists of 11 buildings, including machine shops, etc. The tract is of 40 acres.

American Ore Reclamation Changes

On account of the death of James Gayley, certain changes have been made in the organization of the American Ore Reclamation Co. Eugene B. Clark, formerly vice-president, becomes president of the American Ore Reclamation Co. as well as of the American Sintering Co. Walter S. Reed, treasurer of the American Ore Reclamation Co. from its beginning, becomes vice-president and treasurer. The executive offices of the company remain as before, at 71 Broadway, New York. F. W. Yost, formerly engineer of the American Ore Reclamation Co., has resigned to become district manager of the American Sintering Co., with headquarters in Youngstown, Ohio.

Electric Air Compressors

Two air compressors, electrically driven and designed for pressures of 75 lb. and 200 lb. respectively, are now being marketed by the Black & Decker Mfg. Co., Baltimore. The No. 46 compressor has a capacity of 6 cu. ft. of free air per min., and a guaranteed pressure of 200 lb. This machine is designed primarily for pumping tires direct through standard Schrader valves, and is rated to inflate a 44 x 10-in. tire from flat to 140 lb. in 6 min.

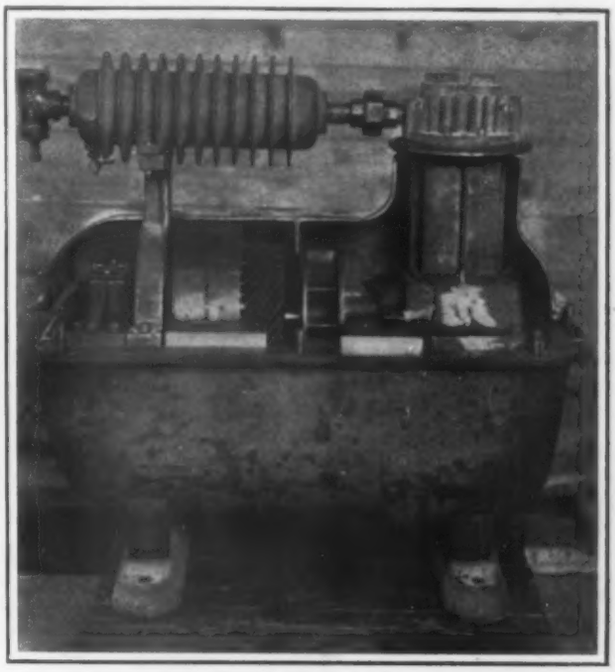
The other machine, known as No. 412, has a capacity of 12 cu. ft. of free air per min. and a guaranteed pressure of 75 lb. The principal uses for this machine are for blowing out motors and machinery, operating small pneumatic tools, paint spraying, flame work and sand blasting. It is also adaptable to maintaining pressure in sprinkler systems for fire protection, starting gasoline and oil engines, aereating and pumping volatile liquids, testing pipe lines, etc.

Both compressors are identical throughout, except that the No. 46, the high pressure machine, has a bore of 2¾ in. and the No. 412 has a bore of 3¾ in. This permits of changing the low pressure machine over to high pressure, or vice versa, at any time by changing the cylinder and piston.

The inclosed design is emphasized as a feature. This, it is explained, affords protection from abuse and damage from outside sources, eliminates the danger of exposed belting or gearing, maintains correct alignment of all moving parts, and forms the basis of the company's patented air cooling. The compressor is operated by a 2-hp. motor. A centrifugal fan on the armature shaft draws air in over the armature, circulates it around the motor windings and then forces it out through an air jacket around the compressor cylinder. The entire unit is grease lubricated, fresh grease being required only at three-month intervals.

The compressors are supplied for 110 or 220-volt direct current, 220-volt two-phase, 110 or 220-volt three-phase 60-cycle alternating current. Either compressor can be supplied with a 38-gal. copper brazed steel tank arranged for stationary use, or mounted on a three-wheel carriage when portability is desired.

Electrically Driven Air Compressor Designed for 75-Lb. or 200-Lb. Pressure. Either size of machine can be supplied with a tank arranged for stationary use or mounted on a three-wheel carriage



Standard Sizes for Shafting

The Council of the American Society of Mechanical Engineers has approved the report of a committee formed to investigate the standardization of shafting sizes and has accepted the following lists of sizes as recommended standards for the society:

Transmission Shafting:

15/16 in.; 1-3/16 in.; 1-7/16 in.; 1-11/16 in.; 1-15/16 in.; 2-3/16 in.; 2-7/16 in.; 2-15/16 in.; 3-7/16 in.; 3-15/16 in.; 4-7/16 in.; 4-15/16 in., 5-7/16 in., and 5-15/16 in.

Machinery Shafting:

Size intervals extending to 2½ in., by sixteenth inches; from 2½ in. to 4 in., inclusive, by eighth inches; from 4 in. to 6 in., by quarter inches.

These standard sizes have also been approved by representatives of the following associations:

American Hardware Manufacturers' Association
American Railway Engineering Association
American Supply & Machinery Manufacturers' Association
National Association of Manufacturers of the U. S. A.
National Association of Purchasing Agents
National Machine Tool Builders' Association
Southern Supply & Machinery Dealers' Association

It was the opinion of the committee that the adoption of standard sizes of shafting will mean that in the future there will be a gradual elimination of odd sizes from makers' lists and from dealers' stocks, and for new construction only standard sizes would be selected.

The standardization of the shafting formulæ and the dimensions of shafting keys and keyways will next be considered by the committee, which plans to reorganize itself and add to its membership.

Industrial Court Commended

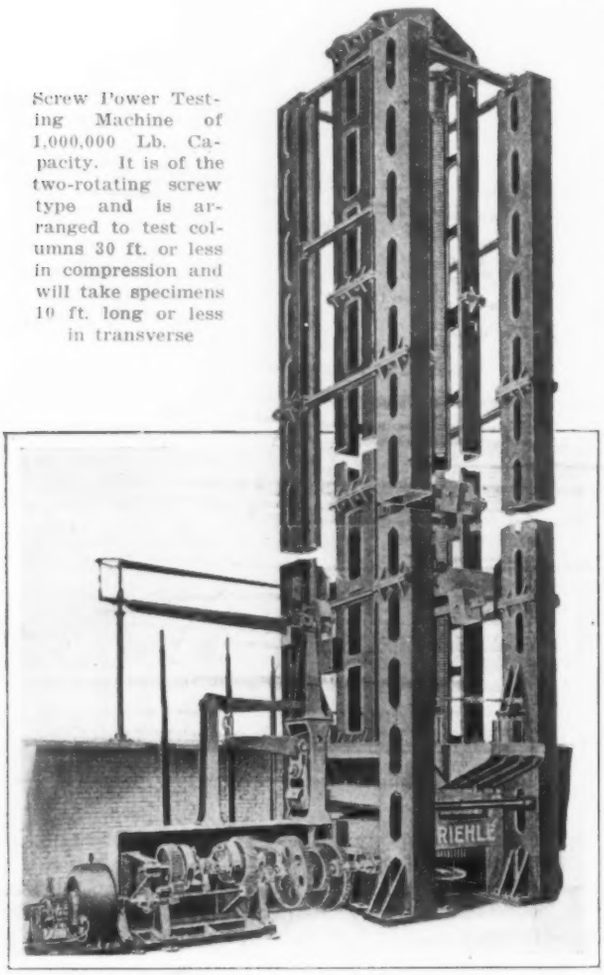
WASHINGTON, April 19.—That the Industrial Court, established in Great Britain by authority of the Industrial Courts Act of Nov. 20, 1919, has commended itself to both employers and employees is asserted by Sir Robert Horne, British Minister of Labor, in a statement forwarded by Consul Robert P. Skinner, from London. The president of the court is Sir William Mackenzie, and among the members are Violet Markham and Cecile Matheson, representing the women. The court is a standing tribunal, the creation of which was one of the recommendations of the Committee on Relations between Employers and Employees, better known as the Whitley Committee. It is the desire of the Government that trade disputes shall be settled as far as possible by negotiations between employees' associations and trade unions. Appeal is taken to the Industrial Court in cases where agreement is impossible, provided the consent of both parties to the dispute is forthcoming.

Large Vertical Screw Power Testing Machine

A vertical screw power testing machine having a 1,000,000 lb. capacity has just been completed for the United States Government by the Riehle Bros. Testing Machine Co., of Philadelphia. This is to be installed at the Forest Products Laboratory, Madison, Wis.

The machine is of the two-rotating screw type similar to those now in use by the American Steel Foundries, Alliance, Ohio, and the W. H. Miner Co., Chicago, Ill., but has special features not on those machines. It is arranged to test columns 30 ft. or less in compression and will take specimens 10 ft. long or less in transverse. When arranged for tensile specimens the maximum travel of the pulling head is approximately 29 ft.

For tensile testing the top or weighing head can be secured at four different elevations according to length of specimens to be tested, and is held in place by two keys which pass through openings in the



Screw Power Testing Machine of 1,000,000 Lb. Capacity. It is of the two-rotating screw type and is arranged to test columns 30 ft. or less in compression and will take specimens 10 ft. long or less in transverse

weighing columns. The weighing mechanism is entirely independent of the power mechanism.

The machine weighs approximately 150,000 lb., is 45 ft. over all height, 37 ft. above floor line when table is level with floor, 15 ft. long and 10 ft. 8 in. wide. The tensile grips will hold specimens from 1 in. to 6 in. round or square and flat specimens up to 12 in. by 4 in.

The weighing beam is of the micrometer dial screw type. The dial is graduated by 100 lb. marks to 10,000 lb. And the beam readings are by 10,000 lb. to 1,000,000 lb. A needle beam is provided to magnify the swing of the weighing beam. A one-tenth poise is also furnished to be used for light loads. These are four speeds, 10 in. per min. for adjusting the pulling head, and pulling speeds of 2 in., ½ in., 1/10 in. per min.

President L. J. Campbell is purchasing equipment for the new plant of the Electric Alloy Steel Co., construction on which will be started within a short time on a site in Trumbull County, Ohio.

Electric Pig Iron from British Columbia Ores

VICTORIA, B. C., April 10.—Steel interests on the lookout for new fields capable of extensive development are now sizing up the prospects in British Columbia. That there are large deposits of iron ore and other metals essential to the steel industry, located in Canada's most westerly province, has been proven conclusively by eminent authorities. The problem confronting prospective investors, however, has always been that of economy in production and markets.

Reports now current indicate that these difficulties have largely been overcome and that there are now several parties prepared to establish furnaces. Important developments in this connection are expected in the near future.

The practicability of the establishment in British Columbia of an iron and steel industry was the subject of an interview recently between G. Lewis Casey, president of Smelters' Steel Co., Seattle, and Hon. William Sloan, British Columbia's minister of mines. Mr. Casey's company has acquired extensive iron ore deposits, together with a 10-acre tract at Dean Channel, a mainland inlet about 100 miles north of Vancouver Island. According to Mr. Casey, conditions for the extraction of ore, which assays 52.50 per cent metallic iron with very small percentages of impurities, are ideal.

A considerable quantity of this British Columbia ore has already been shipped to the plant of the Smelters' Steel Co., Seattle, where, by means of the electrothermic method, it has been converted in one operation into the highest grade of gray iron castings. Mr. Casey's plan is to establish in British Columbia a furnace to handle the ore, and in this effort he will probably be protected by the iron bounties act, under the terms of which a company producing pig iron from local ore in the province will receive from the government a bounty of $3 for every ton manufactured. The act is scheduled to lapse after Dec. 31, 1923.

Robert R. Neild, representing the Nova Scotia Steel Co. in British Columbia, is now working upon a plan for the establishment of electric process furnaces in this province, and already he has a small plant in operation at Vancouver. British steel interests are prepared, Mr. Neild avers, to grant rights for the utilization of a special process if the provincial government agrees to certain stipulations. These interests are of the opinion that British Columbia iron ores (magnetite and hematite) can be commercially smelted into pig iron and refined to pig steel in one continuous process. They hold that the government must own the iron ore areas and be prepared to hand over their development to reputable British iron masters.

The process outlined to Mr. Neild is described briefly as follows:

To manufacture 15,000 tons of pig iron per annum three 3-ton furnaces are required, each to make eight heats per day, or a capacity of 72 tons. Allowance is made of 40 per cent for stoppages, the total product thus being about 50 tons a day. Ten thousand horsepower would be needed, and it is estimated that the total cost of the furnace for three units would approximate $100,000 with all accessories. As one ton of pig produced from two tons of magnetite requires theoretically 2300 kw. hr., in practice about 2500 kw. hr., unless electric current is cheaper than 0.7 ton of coke, the electric process is not commercial. Auxiliary requirements are lime, graphite or charcoal and silver sand and electrodes. The furnace is of the hearth type, operating on the resistance principle. The sulphur slags down with the phosphorus remaining in the pig. According to those who have used the process, it is possible and commercial to continue the refining of pig iron to pig steel without further cost by dephosphorizing.

F. J. McCarthy and J. M. Flood have incorporated the Federal Iron Works Co. at Youngstown, Ohio, with $25,000 capital.

Iron, Steel and Heavy Hardware Meeting

At the opening session, Tuesday morning, of the annual meeting of the American Iron, Steel and Heavy Hardware Association, to be held on May 4, 5, 6 and 7, at the Bellevue-Stratford Hotel, Philadelphia, John A. Topping, chairman Republic Iron & Steel Co., and Homer L. Ferguson, Newport News Shipbuilding & Dry Dock Co., and president of the Chamber of Commerce of the United States, are to give addresses. Andrew Wheeler, Morris, Wheeler & Co., Philadelphia, second vice-president of the association, is scheduled to give the address of welcome, and addresses are also scheduled by C. M. Roehm, Detroit, member of the advisory board of the association, E. R. Yarnelle, American Horse Shoe Co., and S. L. Orr, Orr Iron Co., Evansville, Ind., president of the association.

An open session is to be held on Thursday morning, May 6, 10 a. m., at which the following addresses are to be made: Frederick H. Payne, Greenfield Tap & Die Corporation and president of the American Hardware Manufacturers' Association; N. J. Clarke, Lake Erie Bolt & Nut Co. and president of the Bolt, Nut and Rivet Institute; and Nathan B. Williams, associate counsel National Association of Manufacturers.

Executive sessions will cover the following topics: "Some Practical Problems in Warehousing" by A. C. Sherman, Morris, Wheeler & Co., Philadelphia; report of iron and steel committee by E. McK. Froment, New York; "Steel Market from the Distributers' Point of View"; Average Costs and Warehouse Spread"; report of bolt committee, E. J. McCarthy, Buffalo; report of horse shoe committee, H. A. Sadler, Sioux City; report of committee on blacksmith supplies, Ray Humphrey; report of committee on wagon and carriage makers' supplies, J. S. Proctor, Minneapolis; report of motor accessories committee, George Niekamp, St. Louis; report of committee on cost of doing business, B. S. Reardon, Sioux Falls, S. D.; report of transportation committee, James A. Coe, Newark, N. J. Addresses were also announced by T. James Fernley, Philadelphia, secretary-treasurer National Hardware Association, and George D. McIlvaine, Pittsburgh, secretary-treasurer National Pipe and Supplies Association.

A theatre party will be held on Tuesday evening, May 4; a reception and dance on Wednesday evening, and a complimentary dinner, entertainment and smoker tendered on Thursday night by the Philadelphia trade. On Wednesday morning a visit will be made to the plant of the Lukens Steel Co., Coatesville; the train leaves at 11:30 a. m., and luncheon will be served by the company prior to a visit to the plant. On Friday, by steamboat, the shipyards and other points of interest on the Delaware River will be visited, including a stop at the League Island Navy Yard.

Small By-product Coke in the Blast Furnace

An interesting discussion of the use for small domestic by-product coke in blast furnace operation took place at the bi-monthly meeting of the Southern Ohio Pig Iron and Coke Association held in Cleveland, April 23. It was brought out at this meeting that a southern Ohio furnace recently for some time used 100 per cent of small domestic by-product coke, that had been screened three times and was uniform in size and without dust or fines. This coke was used exclusively because the furnace was unable to get furnace coke and it was found that the small size of domestic coke held the burden up as well as furnace coke, and that its use was entirely satisfactory.

Another matter that came up was a plan to establish a standard method for rating capacities of blast furnaces. Members agreed that it was advisable to establish a uniform method for arriving at a furnace capacity and a committee, of which Chas. R. Peebles of the Ashland Iron & Mining Co., Ashland, Ky., is the chairman, will prepare a plan for rating which will probably be adopted at the next meeting.

The members of the association that were present, about 15 in number, were entertained at the Union Club by the iron ore firm of Oglebay, Norton & Co.

New Life in Trust Prosecution

WASHINGTON, April 27.—The Government's trust prosecution program, which encountered a setback in the United States Steel Corporation case, has taken on new life as a result of the decision of the Supreme Court in the Reading railroad and anthracite coal case. The court ordered the dissolution of the combination of the Reading Co., the Philadelphia & Reading Railway Co., the Philadelphia & Reading Coal & Iron Co. (a coal mining company), the Central Railroad Co. of New Jersey and the Lehigh and Wilkes-Barre Coal Co. The case had been appealed from the Eastern District of Pennsylvania. The decision affirms the decision of the lower court in part and reverses it in other parts.

The decision gives another example of the uncertainty surrounding the interpretation of anti-trust laws. As in the Steel Corporation case, the decision was by a four to three vote of the court with the same two members, Justice McReynolds, who was disqualified by reason of his former service as attorney general from participation in the case, and Justice Brandeis, who had committed himself before taking the bench on the trust question, not participating.

The Reading case was adverse to the corporations involved, a controlling influence appearing to be the fact that Justice McKenna, who wrote the majority opinion in the Steel Corporation case, was one of the four justices who held the Reading corporations to be violating anti-trust laws. The three justices who joined with Justice McKenna in the majority opinion in the Steel Corporation case, giving that corporation a clean bill of health, filed a dissenting opinion in the Reading case. These three justices were Chief Justice White and Justices Van Devanter and Holmes. The three justices who filed a dissenting opinion in the Steel Corporation case, holding that corporation to be operating in violation of anti-trust laws, joined with Justice McKenna in the majority opinion in the Reading case. These three were Justices Clarke, Pitney and Day. Justice Clarke wrote the majority opinion.

The majority opinion in the Reading case does not cite the Steel Corporation case as a precedent, but mentions the Northern Securities and other cases.

To Relieve Housing Shortage

Iron and steel companies have agreed to subscribe for stock in a $5,000,000 corporation to be formed at Youngstown, Ohio, to loan money for home construction. The movement has the backing of commercial and industrial interests and six leading civic organizations, which hope, in this manner, to partially relieve a growing house shortage. The company is to be called the Youngstown Homes Co., with a capital stock of 500,000 shares of common, par value $10.

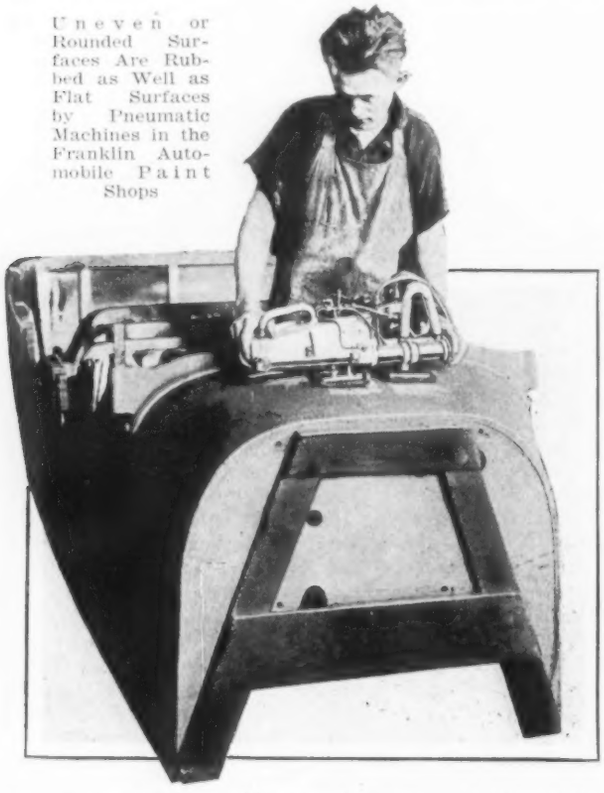
A meeting of about a dozen sales managers of the Jones & Laughlin Steel Co. from different cities is being held in its general sales office in Pittsburgh this week, to discuss the present conditions and selling plans for the current year. These sales managers will have daily sessions and will make visits of inspection to the Soho and Southside plants at Pittsburgh, also to the blast furnaces, steel plant and finishing mills at Aliquippa, Pa. On Wednesday evening this week, the sales managers were tendered a dinner by the company at the Duquesne Club, Pittsburgh.

Christian Girl, former president of the Standard Parts Co., Cleveland, has purchased the plant of the Kalamazoo Spring & Axle Co., Kalamazoo, Mich., and will become president and general manager of that company. Among those associated with him in the new company will be J. G. Utz, formerly vice-president of the Standard Parts Co., who will be chief engineer.

Extensive improvements at the Lebanon, Pa. plant of the Bethlehem Steel Co. are nearing completion. Warehouse, factory and cooper shop departments will be housed in new buildings.

Rubbing Machine for Flat or Rounded Surfaces

A machine designed to supplant hand rubbing in paint shops is the invention of Spencer Brown of the experimental department, H. H. Franklin Mfg. Co., Syracuse, N. Y., builders of the Franklin car. It is manufactured by Franklin Products, Inc., Syracuse, N. Y. The machine has been used in regular production operations in the Franklin automobile paint shops for a number of years. The manufacturer states that



Uneven or Rounded Surfaces Are Rubbed as Well as Flat Surfaces by Pneumatic Machines in the Franklin Automobile Paint Shops

operators have been able to rub out seven bodies daily, which is double the amount of work turned out by the hand rubbers.

The machine has two feet, or kickers, working in opposite directions at each stroke, and uses compressed air as a propellant. Construction of the rubbing machine feet makes it possible to rub on uneven or rounded surfaces as well as on flat surfaces. The frame and all possible parts are made of aluminum and the total weight is but 20 lb. The machine can be used on vertical as well as on horizontal surfaces. Moreover, it rubs with the same materials as are used in hand rubbing.

The Position of the Electric Furnace in Iron and Steel Metallurgy

The official abstract given in THE IRON AGE of April 15, of the paper of Lewis B. Lindemuth of New York, before the recent Boston meeting of the American Electrochemical Society did not accurately represent Mr. Lindemuth's views in one or two particulars. We therefore present below the concluding paragraphs of the paper in which Mr. Lindemuth made his summing up:

The electric furnace from the metallurgical point of view permits more flexibility in the application of processes and varieties of product than any other steel-making furnace yet devised. Its flexibility requires more knowledge on the part of the operator as to principles, because of the fact that he can apply any one of them, whereas all other processes require knowledge of only the limited principles involved in that particular process.

Electric-furnace steel can and should be superior to other grades of steel, but it is so only when properly made and when the phases of manufacturing steel other than the melting have been properly provided for.

Too little knowledge on the part of the operator and, we might say, over-enthusiasm on the part of salesmen in introducing furnaces where the economics do not permit, have jeopardized the position of the electric furnace and have made both the product and the economy often questionable.

The electric furnace is an addition to and not a replacement of all the former skill in steel manufacture, and when it becomes understood as such and when the sale of one furnace which brings returns to its owners is realized to be a better advertisement than the sale of two furnaces only one of which is successful, the position of the electric furnace in the industry will be as it should be, namely, that it is metallurgically the best steel-making instrument, and in its proper place also the most economical.

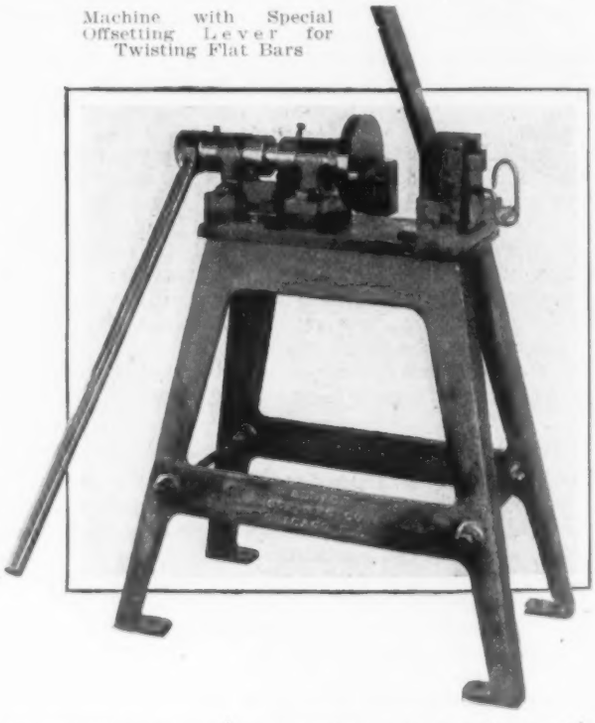
Soft Coal Situation

WASHINGTON, April 27.—Some calculations as to the bituminous coal situation for the year 1920 have been made by George H. Cushing, managing director of the American Wholesale Coal Association. Mr. Cushing estimates that the demand for bituminous coal in 1920 will be approximately 540,000,000 tons. He says that there is no room to doubt that the bituminous coal mines can produce that much coal. In 1918 they actually produced 586,000,000 net tons, which was 51,000,000 tons in excess of this year's demand. The potential production of the mines is much larger, figures for 1918 showing that if maximum production had been continued 12 months of the year on the basis of the months of July, August, September, and October, the total for that year would have been 648,000,000.

The key to the situation is whether there will be a shortage of coal cars to move the coal from mines to market. Mr. Cushing holds that with efficient railroad management the coal can be moved in time to avert any shortage.

Bar Twisting Machine

The accompanying illustration shows a special machine built for the twisting of flat bars by the Wallace Supplies Mfg. Co., 412 Orleans Street, Chicago. This particular machine is arranged with



Machine with Special Offsetting Lever for Twisting Flat Bars

an auxiliary lever for offsetting the stock in such a manner as to leave the vertical edge parallel with the flat side after the twist has been made, instead of centering the twisted portion as is usual. The work can be done either hot or cold, depending somewhat on the size of material to be twisted.

J. S. Lewis, secretary Triumph Ice Machine Co., Cincinnati, and secretary Refrigerating Machinery Manufacturers' Association, a national organization, has completed arrangements for the holding of the annual meeting of the above organization at Hot Springs, Va., during the first week in June.

Machine for Grinding Small Taps

A machine for grinding taps smaller in size than those accommodated by the machine described in THE IRON AGE, issue of April 8, page 1014, has been placed on the market by the Grand Rapids Grinding Machine Co., Grand Rapids, Mich. This is known as a No. 1 machine and is designed for taps ranging in size from as small as No. 6 machine screw to a maximum of 1-in. diameter plug taps. It will also grind taper taps, where the length of the taper does not exceed 1½ in. in length.

In handling the taps with centers, they are mounted between the centers the same as on the larger size machine. In the case of the small taps, which are not provided with centers, the shank is carried in a Jacob's chuck, and the point is carried in a female center. The chuck and female center are made interchangeable with standard centers.

In order to facilitate the handling of these very

Grinding Machine for Taps from No. 6 Machine Screw Up to 1 In. in Diameter Plug Taps

small taps, the tap holder is mounted in a horizontal position, and the grinding is done on the periphery of a straight wheel. The principle of operation is that the axis on which the tap is swung in the grinding operation, is offset from the tap's working axis an amount sufficient to provide the desired degree of clearance, the amount of offset being adjustable, and it may be offset either to the right or left of center for either right or left hand taps. The angle of taper or lead is also adjustable, taking care of anything from a very blunt plug to a long taper.

The spindle construction is of ring oiled type bronze, with the housing bored on a taper, and bronze bushings turned to the corresponding taper, with adjustable collars, for taking up wear, in which are mounted felt rings for excluding dust. The diamond trueing device with diamond is furnished as part of the standard equipment.

The Hanson Clutch & Machinery Co., Tiffin, Ohio, has recently increased its capitalization from $60,000 to $300,000, and is now building a large addition to the present factory. It will install machine tools to substantially increase its present foundry capacity.

Chrome Mining in Quebec

By KIRBY THOMAS

The chrome mining industry in Quebec, mostly in the eastern townships region associated geologically with the asbestos deposits, which was revived by the war, has survived and promises to be an important source of chromite for the United States market.

Chrome mining in Quebec began in 1886, but the output was less than 3500 tons in any year until 1904, when it reached 6000 tons. For about five years the production kept above this high water mark, attaining 9000 tons in 1906. In 1910 the production fell to less than 300 tons. During the next four years the combined output was considerably less than 1000 tons. In 1915, with the war stimulus, the output was over 12,000 tons; in 1916, 27,500 tons and in 1917, 36,700 tons. These figures relate chiefly to crude ore, 35 to 45 per cent chromic oxide. In 1918 the production was 6389 tons of concentrates, averaging 49 per cent and 15,600 tons of crude ore averaging 35 per cent. The 1919 production was about 9000 tons of concentrates and 2600 tons of crude ore.

These statistics are of interest to the American chrome users as showing the production possibilities of the chrome deposits located geographically nearest to the greatest centers of chrome consumption. The deposits of the Southern States are negligible as a supply, and the Wyoming, Oregon and California deposits are geographically distant and available only to railroad transport. The most convenient sources of supply of sufficient tonnage possibilities are in Cuba, Venezuela and Costa Rica. These foreign sources have the great advantage of cheap ocean transport and also cheap labor at the mines. The New Zealand and Turkish chrome ores, formerly the chief American supply, have been kept out of the American market by reason of the relatively high transocean freights and disorganized shipping conditions since the war. British demands are being largely met, as before, from India.

The proposed tariff on chrome will, of course, affect this Canadian supply unless, as is not unlikely, the reciprocity idea again comes to the front and in effect. The war stimulus has demonstrated the production possibilities of the Quebec deposits; in fact, it was not realized heretofore that these deposits continued in depth nor were amenable to cheap and effective concentration treatment.

A large part of the Quebec production is going to the chemical industries and not to the steel makers. One of the largest operations in the district is owned and operated by an American chemical house and much of the product is sold to other chemical concerns for their varied and growing uses for the chrome base.

The present operations are mostly near Black Lake, although good deposits are known to exist elsewhere in the serpentine belt, which is about 50 miles long. The Mutual Chemical Co., an American company, has a shaft down 200 ft. and is reported to have three years' ore in sight. This company is completing a new mill with a capacity of 150 tons daily. It is proposed to treat ore running from 10 per cent up. The Belanger property is also erecting a mill and the Black Lake Asbestos & Chrome Co. mill is in operation after alterations. Several smaller shipping operations are under way.

The Quebec chrome mines will propably continue to be an increasingly important source of supply for the American market, partly because of their geographical situation, but also because of the better knowledge of the deposits and the improvements in treating the ores which have come from the needs of the war times.

The Illinois Central Railroad has taken the first steps toward the electrification of its suburban lines in Chicago. Fifty steel coaches designed for use in steam trains until the lines are electrified, and then as motor equipment, have been contracted for, and plans have been completed for starting work on a new subway under Michigan Boulevard to the Randolph Street Station, within a few days.

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Steel Mill Order Books

Attention is being directed to the widely different distances ahead to which the Steel Corporation on the one hand and the independents on the other hand are booked. Some estimates make it that the independents, in the aggregate, have less than half as much material sold, relative to capacity, as has the Steel Corporation. The usual conclusion drawn is that the condition is wholly a reflection of the prices maintained by the various sellers. There are other considerations, however, that should be noted.

On account of its size and the wide distribution of its plants, the Steel Corporation naturally seeks the business of the larger consumers, and the larger consumers naturally gravitate to it for a part at least of their steel. Among consumers, the larger naturally buy farther ahead than do the smaller, so that if other things were equal the corporation subsidiaries would naturally be sold somewhat farther ahead than the large independents.

Another point to be taken into account is that the "independents" include a wide variety of sellers. Among the smaller mills for many years a certain class has been recognized which made it a rule not to sell far ahead, whether times were good or bad. If prices were low and profits near the vanishing point for the average producer, such mills preferred not to have engagements that would force them to run, perhaps at a loss, while in very active times there was usually an opportunity to secure delivery premiums. In comparing the size of order books it is hardly pertinent to include such mills, whose reckoning would pull down the general average of the independents.

A third point to be considered is that the United States Steel Corporation has a large and well established export trade, and in export trade, particularly the kind of export trade the corporation has cultivated, transactions frequently cover long periods. The corporation in its monthly unfilled tonnage statements does not include intercompany transactions and thus does not recognize allotments made by the manufacturing subsidiaries to the export subsidiary, but presumably it includes actual sales made by the export company.

There is one divergence in the other direction, however, that being that the Steel Corporation conducts a large and increasing warehouse business. This business is cognate to the sales the independent producers make to jobbers, but there is very little by way of advance commitment. To be precise, one should set the "unfilled obligations" of the Steel Corporation not against its total capacity or shipments but against such total minus the amount of warehouse business it does. Thereby the distance ahead to which the Steel Corporation appears to be sold would be slightly increased.

All these, however, are relatively minor considerations. While computations or estimates may be inexact and slightly misleading, the fact is clear that the half dozen largest independents, in times past following much the same sales policies as the Steel Corporation, are at the present time sold up to a much smaller distance ahead than is the leading interest. The policy of restricting commitments was adopted in a rising market for the purpose of taking advantage of price advances, in which advances it was expected for quite a while the Steel Corporation would eventually elect to participate. In recent weeks the conservative policy of buyers in some lines has exercised an influence upon the distance ahead to which the independents are sold.

The Function of Merchant Furnaces

The function of the merchant blast furnace has been changing from period to period. That there have been changes very recently is indicated by the fact that in 1919 only 28 per cent of the total production of pig iron in the United States was made for sale, while of this quantity only 30 per cent was of Bessemer, low phosphorus or basic grade.

The time was when the making of pig iron was a trade, or an art, by itself. Nearly all the pig iron made was sold to some one else. In the days when the puddling furnace held chief sway there were many blast furnaces and many iron mills and the former sold to the latter, as a mat-

ter of course. As steel making developed and integration became the vogue, steel works built blast furnaces of their own, and in some cases even bought blast furnaces.

It was a common custom, say for the first decade of the present century, for the large steel interest to aim to have its blast furnace capacity somewhat less than the limit of pig iron consuming capacity of its steel units. If it became desirable to push the production of steel to the limit, merchant pig iron would be bought. As a rule the pig iron was obtainable at prices that were quite satisfactory to the steel producer. To an extent the merchant furnace's function was that of a shock absorber. It could stand idle when demand was light, and get into operation in order to help the steel works out when demand became heavy.

A trend then developed in a different direction, and two or three steel interests became sellers of pig iron, but this did not continue. What is left is that the large steel interests do not, as formerly, buy merchant pig iron when there is a bulge in demand for iron and steel products generally.

One remaining function of the merchant blast furnace has been to supply pig iron to the smaller steel producers, but this is now distinctly a minor function, when only 30 per cent of the merchant production is of steel making grade. Even of that 50 per cent, indeed, a portion is not sold to steel works but to ingot mold foundries. Another and larger portion is sold to steel foundries, so that the quantity of merchant pig iron that is sold for making into rolled steel is really quite small.

The relationship between steel prices and pig iron prices has been lost. The steel market used to make the pig iron market. Steel prices would advance, and then some of the large steel works would buy pig iron, thus producing a rise in pig iron. The rise in pig iron that began late last year was produced by no such means, and furthermore it entirely outran the rise in steel prices. Thus the steel company that is dependent for its pig iron upon the open market is in an uncomfortable position. Such a company cannot control the price of pig iron, but must submit to its prices being made by another class of buyers, the foundries.

There is room for speculation as to the future of the merchant furnace. It seems hardly likely that the pig iron market will be stabilized by the erection of more merchant furnaces, thus increasing the business of making pig iron for steel works. There is a greater chance that the smaller steel works when erection costs are less discouraging, will be disposed to build blast furnaces with the object of supplying themselves and of selling pig iron when occasion presents itself. Except perhaps to a large ore interest, a merchant furnace is not an attractive investment. The very magnitude of the profits occasionally made it not encouraging, it being so obvious that such profits cannot be continuous. An enterprise that must make its profits every third year or so and be in the dumps two-thirds of the time does not appeal to the American business man, if indeed it could appeal to anyone at all.

Making Progress in the Metal Trades

A year ago THE IRON AGE said of the convention of the National Metal Trade Association that a new note on industrial relations was repeatedly struck at the sessions held in New York at that time, for there was far less of the spirit of antagonism that had marked the association discussions of labor questions in previous years, and it was stated that the convention would go down as one which recognized the new era in the relations of metal trades workers and employers, and the obligations imposed by the changed conditions. This same tendency was marked in the convention which was held in New York last week, and President O'Leary was well within the truth in claiming that the association had maintained an open mind, especially as to the discussion of employee representation, which was given considerable time a year ago and one entire morning session last week.

No one claimed to be speaking the last word in regard to employee representation, and it was evident that there was a difference of opinion as to whether any of the plans to promote industrial democracy in that way should be adopted. Valuable contributions to the discussion were made by Thomas Wright, manager of Industrial Relations of the American Multigraph Co., and by A. H. Young, who holds a similar position with the International Harvester Co. Mr. Wright placed emphasis upon the importance of not introducing any plan of employee representation until the subject had been thoroughly discussed with the employees. To foist any plan suddenly upon the men would, he said, be disastrous, but when the men were once convinced of the merits of a plan, they were not easily persuaded to abandon it. One of the highly gratifying features of the experience of the company was that the men had thoroughly investigated before making any important recommendations for changes as to hours or wages, and in several noteworthy cases requests for advances in wages had been declined by the committee of employees.

Another important development was the tendency to get away from any policy that would force all the men to one level. The committees favored discriminating in such a way as to increase production through the awarding of unusual merit, and recommended several discharges for incompetency. As to the question of the changing from a nine-hour to an eight-hour day, the proper committee is now making a thorough investigation. The success in encouraging the saving by the men of a considerable part of their earnings was most gratifying, as were also the results of efforts along educational lines, including the training of salesmen. Although there is a "cabinet" of company officials which can veto any action of the "congress," the recommendations of the latter body have been so fair that the cabinet has never been called upon to function.

It was frankly acknowledged by Mr. Young that employee representation or the works council plan in vogue at Harvester company plants had not fully stood the test of the strike period last

fall, but his confidence in it is unshaken. The strike was started in one of the plants where there was no works council and other plants were closed as a matter of precaution upon the advice of the members of the works councils who were friendly to the company.

Objections to employee representation as advanced at the convention were based largely on theories of what might happen, such as the men getting control of plants, or industrial politicians developing and extending favors to some employees, while dealing with undue severity with others. There was, however, no actual evidence of results of this kind.

On the whole the discussion was most helpful, being conducted in fine spirit, and it is expected that it will be continued next year in such a way as to be still more helpful and more conclusive after the experience of another twelve months has been obtained.

German Job Shops

A number of American manufacturers are studying seriously the possibilities of utilizing German industrial plants as "job shops." By so doing they would obtain the use of manufacturing facilities, comprising organization, equipment and labor, now practically idle, in a manner which on the face of things appears to offer profit to all parties to the transaction; the American manufacturer, the German manufacturer, his workmen and the German nation as a whole. The experiment has already been tried and thus far satisfactorily.

A question that has not yet been answered, however, is whether Germany has become stabilized to the extent of removing the gambling element from the job shop proposition. It is not a problem of currency values or of normal economic considerations. It resolves itself into the degree of menace contained in the German Government, especially in the matter of taxation. The terrific burden of the imperial "sacrifice" tax, which is reducing fortunes made in the war and before the war to practically nothing, suggests possible applications of similar socialistic principles to industries. Then, too, there is the social unrest, the consequences of which cannot be foretold. These considerations are acting as a brake on the desire to use German shops and mills to increase production and to make money by so doing. All that can be said to-day, those who have been over the field assert, is that if conditions in Germany get no worse, and so long as German currency remains deeply depreciated—and the economists are unanimous in their opinion that it will be a long time before anything approaching parity will be reached—the opportunities offered by the German job shop offer rich reward.

The plan involves a straight contract shop proposition, following the American practice, excepting as to raw materials. The German manufacturer furnishes the plant and workers, keeps accurate account of costs of production, converts the materials into finished forms, and submits his bill, which is the total of costs of manufacture plus an agreed per cent of profit. His customer ships to him the raw materials as a loan. They are plainly marked, to prove that no money shall be paid for them; otherwise the transaction might come under the governmental ban as involving the shipment of money from the country, thus tending further to depreciate the currency. The bill is paid in cash. Wealth is added to the nation; none is taken away. For that reason it is argued that even an ultra-socialistic government would be slow to interfere in any way that would discourage the carrying out of the plan in increasing volume.

The foreigner for whom the German plant is working makes his profit in another way. The cost of manufacturing the goods which are billed to him in his own country—the United States, for example—is on the basis of marks, which means almost the limit of cheapness as reckoned, say, in American dollars. Even should a worker in a German factory receive six marks an hour for his labor, which is high indeed, he is earning nine cents of American money, as his cost affects the American market. It is figured that under these conditions manufacturing costs are so low that, even allowing the German manufacturer a truly large percentage of profit, the goods could be shipped to the United States, and the tariff and all other expenses be paid, and still be able to compete to advantage in the market with the same goods manufactured here.

As a matter of fact, however, few products manufactured in German job shops would come to this country. They would be shipped to European countries other than Germany and her sister Entente nations, where they would be absorbed speedily and at much profit. The margin between cost and selling price naturally would be a wide one.

American manufacturers who have been in Germany in recent months express the unqualified opinion that some such method as the job shop would do more than any other thing to put that country on its feet financially and industrially. As is well known, Germany cannot pay cash for raw materials produced in other countries; the prices reduced into marks are literally ruinous, and the government is doing everything in its power to prevent the currency depreciation from getting even worse. What Germany needs is the loan of cash or materials, and the most available assistance appears to lie in materials to be worked into products for distribution at home and abroad. Only by methods such as this can her credit be restored by correcting the balance against her.

One of the most marked changes in the flow of exports and imports following the war has taken place in certain ferroalloys. During the war exports of ferrotungsten and ferrovanadium reached phenomenal proportions. The outgo of ferrotungsten and tungsten powder in 1917 and 1918 showed a combined total of over 3,000,000 pounds, while that of ferrovanadium was nearly 4,000,000 pounds for the same two years. In 1919 these exports fell to 38,130 pounds in the case of tungsten and to 64,600 pounds in that of vanadium. At present imports of these two ferroalloys and of ferrochromium are expanding rapidly. Before the war imports of ferrochromium, while substantial,

were not large, having been about 200 tons in 1914, but in 1919 these imports were 413 tons, all in the last half. In tungsten a similar situation exists. Imports of this metal and its alloy were less than 100 tons in 1914, but last year they were 177 tons, the greatest portion of this coming in in the last quarter of 1919. Very little if any ferrovanadium has ever been imported into this country, but an indication of the scarcity of this alloy is shown by the importation of 11,200 pounds in the last quarter of 1919. These facts, particularly as regards tungsten and chromium, have their direct interest in the present controversy as to the need of a tariff on these two products.

French Electric Iron and Steel

Electricity as a source of energy was one of the surprising developments of the war in the French steel industry. Coal supplies had been confiscated and many blast furnaces and open-hearth plants had been appropriated early in the war. Of the 170 blast furnaces in France existing early in 1914 more than half were in German hands during the entire war. Of 164 open-hearth furnaces and 100 Bessemer converters in 1914, Germany was in possession during the war of 48 of the former and 53 of the latter. By this and other means the French output of crude steel was reduced to 58 per cent.

From complete data, recently issued, it is now possible to measure in part the rôle which electricity played. In 1914 there were only 13 furnaces in France making electric steel, but at the end of 1918 there were 31 furnaces of this type with 11 under construction. By 1916 the electric steel output had doubled and in 1918 it nearly tripled over the 1913 production. And in 1918 the total steel ouput was only about 38 per cent of that of 1913.

A particularly interesting feature was the production of electric or synthetic pig iron from scrap steel. The scale of making was probably more extensive than that in any other country. In 1913 practically no electric pig iron was produced in France, but in 1916 the output was 46,200 tons and in 1917, 90,300 tons, with 83,950 tons the make of 1918. The 32,000 tons made in Canada in 1918 were regarded at the time as striking. This large French output of low phosphorus pig iron was undoubtedly an essential factor in maintaining the country's open-hearth steel output in the trying times of the war on almost a parity with the pre-war production.

In this connection it is also interesting to note that the output of ferroalloys, other than ferromanganese, blast furnace ferrosilicon and spiegeleisen, was largely increased during the war, having been 50 per cent more in 1918 than it was in 1913, despite the reduced pig iron and steel output.

France was the home of the electric steel furnace and her metallurgists were the pioneers in electric ferroalloys. We shall probably hear more of French electric steel and also of ferroalloys, for France was a large exporter of the latter before the war and is now being heard from again in certain branches of this industry.

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Opposed to Seasonal Rates

WASHINGTON, April 27.—The Frelinghuysen bill providing for seasonal freight rates on coal has met with considerable opposition before a subcommittee of the Senate interstate commerce committee. The Eastern railroads, and chambers of commerce of Cleveland, Pittsburgh, Toledo, and Buffalo protested against the establishment of seasonal rates. It was declared by railroad representatives that during the next two or three years there would be no surplus transportation facilities for coal during the summer months, and that, therefore, the bill would fail of its purpose. They said if lower rates were put into effect, the consumer would not benefit, but that coal operators would make an additional profit.

Carnegie Steel Co. Plans to Aid Employees

Home Buying Encouraged Through Three Methods Which, It Is Believed, Would Greatly Relieve the Housing Situation—Plans of Other Companies

THE Carnegie Steel Co. has acquainted employees at its various works with plans to aid them in acquiring homes for themselves on favorable terms. The offer has created much interest among workers of the company, many of whom have signified their desire to take advantage of it. The offer provides for the sale of homes owned by the company to employees; purchase of homes from private owners for employees and building of homes for its workers either by the company or by a contractor approved by the company. The home owning plan is offered in three possible methods, "A" installment payment plan for an existing dwelling; "B" installment payment plan for building a new dwelling or "C", a mortgage plan.

The first plan applies only to an existing dwelling owned by the company or bought by the company from a private owner for an employee. The dwelling will be sold to him under a contract providing for an initial payment of not less than 15 per cent of the purchase price, the balance to be paid in monthly installments over a period not exceeding 10 years, with interest on deferred payments at the rate of 5 per cent per annum.

Under the second plan, for building a new dwelling, the company will guide the employee in the selection of a proper location, will furnish complete building plans to meet his needs, will assume responsibility for the proper construction of the dwelling at a minimum cost and will sell the dwelling to him on the same terms as outlined in the first arrangement.

The mortgage plan is devised to meet the condition where the employee wishes to make a large initial payment. A loan will be made, not exceeding 75 per cent of the cost of the property, and repayment will be secured by a first mortgage payable in installments over a maximum period of 10 years, with interest at 5 per cent per year. This plan applies not only to existing buildings, but also to homes to be built.

If they wish to acquire a home under any of the foregoing arrangements, employees are advised to secure an application from their foreman or superintendent, file it with the general superintendent of the works where they are employed and it will be forwarded to the general superintendent of the land company affiliated with the plant.

This plan is probably one of the most carefully conceived in the country. In the Mahoning Valley, where the Carnegie company employs over 6500 men at the Ohio Works, Upper and Lower Union Mills and the McDonald bar mills, a number of employees who have entered into agreements for the purchase of homes have inquired for a loan from the company to pay off the balance due on their property. The prevailing interest rate in the Valley on such loans is 7 per cent, whereas the company charges but 5 per cent. Such requests for loans have not been granted, however, as they would amount in the aggregate to several million dollars. Furthermore, it is the primary aim of the company, in these plans, to further the acquiring of homes by its workers, either by purchase or new construction, and it is felt this end would not be furthered by lending sums to employees who are already buying properties.

Under the "mortgage plan," where an employee wishes to make a larger initial payment than is required in the two previous plans, the company will make a loan up to 75 per cent of the value of the property, the loan to be secured by a first mortgage bearing 5 per cent interest per annum. Repayment of this loan will be by uniform payments, at least monthly, including interest, and in such amount as to satisfy the entire indebtedness of principal and accrued interest at or before the expiration of ten years from the date of the mortgage. Payments may be anticipated at any time and in any amount.

The liberal acceptance of any one of these arrangements by employees at the various works of the company promises to do much to relieve the house shortage in industrial communities, where the lack of adequate housing facilities has proved a serious detriment.

Wages Still Advancing

WASHINGTON, April 27.—Payrolls of all 13 of the representative industries on which records are kept by the Bureau of Labor Statistics showed an increase in March over February. Eleven of the districts showed an increase in the number of persons on the payroll and two a decrease.

The iron and steel industry showed an increase of 6.7 per cent in the amount of the payroll, and 1.8 per cent in the number of persons employed. The amount of the payroll increased from $12,075,932 in February to $12,887,959 in March, while the number of persons on the payroll increased from 163,810 in February to 166,732 in March.

Comparison of March, 1920, with March, 1919, shows increases in the amount of payrolls in all districts, and increases in the number of people employed in 11 districts, and decreases in two.

The amount of payrolls in the iron and steel industry increased 25.5 per cent in March, 1920, over March, 1919, while the number of persons on the payroll increased only 6.5 per cent. The total payroll in 111 plants in the iron and steel industry increased from $10,525,648 in March, 1919 to $13,206,450 in March, 1920. The number of persons on the payroll increased from 160,467 in March, 1919 to 170,963 in March, 1920. The comparisons for February and March of 1920 were based on 107 plants in the iron and steel industry, this accounting for a discrepancy in figures.

Labor Resolutions Adopted

Resolutions demanding that Congress and the State legislatures enact laws prohibiting lockouts and strikes in all public utilities and essential industries were adopted at the closing session of the convention of the Mississippi Valley Association at St. Louis on April 21. Resolutions were also adopted urging the incorporation of labor unions and forbidding any person not an American citizen to become an officer of a labor organization. Strict sedition laws were demanded and improvement of the St. Lawrence route from the Great Lakes to the ocean was indorsed. The Mississippi Valley Waterways Association was merged with the Mississippi Valley Association and a waterways division of the organization formed.

In the World of Labor

William Grenehalge, an Englishman, recently arriving in this country, was temporarily held up in Boston on the alleged grounds that his admission would be a violation of the contract labor clause of the immigration laws. He is 57 years old, employed by Dobson, Barlow, Ltd., Bolton, Eng., fine cotton combing machines, and was sent to this country to set up machines in New England. Application should have been made to the Secretary of Labor, Washington, for permission to remain in this country temporarily. Arrangements finally were made whereby Mr. Grenehalge is placed under the care of Atkinson, Haserick & Co., Boston, agents for the English firm, and allowed to complete the work under question. Because other Eng-

lish machinists have been imported during the past few months, the case in question attracted much attention in Boston.

The George W. Prentice & Co., Holyoke, Mass., wire mill has voluntarily increased the pay of its 300 employees 10 per cent, effective April 12.

Two officers of the Springfield, Mass., machinists' union have been found guilty of violating a city ordinance by passing circulars on a public street. The circulars were given Smith & Wesson employees.

The Buckeye Land Co., subsidiary of the Youngstown Sheet & Tube Co., Youngstown, Ohio, has commenced work on a group of brick dwellings to accommodate 100 families at its Overland plant. This is the fourth plant the company has opened since its organization, the dwellings being rented or sold to employees of the parent company. The Buckeye Land Co. is now housing over 400 families.

The Elliott Service Co., 141-145 West Thirty-sixth Street, New York, has issued a brochure on Americanization in industries, explaining the advantages of teaching English to foreign workingmen and of making them acquainted with current events. It describes a system of pictorial bulletins designed for the interest, instruction and inspiration of industrial workers.

The Safety Equipment Service Co. announces the purchase of the business, assets and good-will of the safety department of the Strong, Kennard & Nutt Co., Cleveland, and will be located at 215-221 St. Clair Avenue, N. E., Cleveland.

The Carpenter Steel Co., Reading, Pa., is offering employees 1200 suits for $20 each, though the market price is said to be $70 each. The company bought these suits from the British Government, which found itself with a large surplus intended for English soldiers just mustered out of service.

Unskilled labor at some Waterbury, Conn., brass shops are on strike for a minimum wage of 75c. per hr. and a 44-hr. week.

Mayor Fred J. Warnock advises no May Day parades will be permitted in Youngstown, Ohio, this year, to protect the city from socialistic demonstrations and radical activities. Considerable trouble was experienced during the May Day celebrations last year.

The Standard Flexible Conduit Corporation, 158 Eleventh Avenue, New York, has just welcomed home its chief engineer, Charles S. Staples, and his assistant, Edward M. Rosenfield, who have been touring the country the past month surveying the entire electrical equipment field, with a view to adding several new items to the company's list.

The Remy electric division, Indianapolis, of the General Motors Corporation has presented to 140 of its older employees shares of the corporation, ranging in value from $400 to $700, to be delivered in a year. Similar presentations will be made annually to the older employees.

During February and March the Youngstown Sheet and Tube Relief Association, composed of employees of the Youngstown Sheet & Tube Co., Youngstown, Ohio, received 2917 applications for membership and disbursed $11,998.90 in accident, sickness and death benefits.

A riot resulting from the attempt of several hundred workmen to take the places of striking employees of the Walworth Mfg. Co., Kewanee, Ill., resulted in the sending of two battalions of troops to that city on April 14.

The statement that a reduction had been made in the wages of some of the employees of the Brown & Sharpe Mfg. Co., Providence, R. I., and that certain employees had quit work on that account is incorrect.

The American Chain Co., York, Pa., has adopted a 9-hr. working day at its local plant, instead of 10 hr. The change has been made as a daylight-saving measure and with no reduction in pay. It will be operative until Sept. 4.

Employment in Metal Working in March

The Bureau of Labor Statistics of the U. S. Department of Labor has tabulated information concerning the volume of employment in March, 1920. From these figures the following information has been obtained:

In the automobile industry the number on the pay rolls of 38 establishments in March, 1920, was 126,434 persons, 37.9 per cent more than in the same period in 1919; the amount of the pay rolls was $4,321,986 in one week, 63.6 per cent more than a year ago; the weekly wage payment in March, 1920, appears to have averaged $34.18, 18.6 per cent more than a year ago.

In car building and repairing the number on the pay rolls of 51 establishments in March, 1920, was 48,535 persons, 12.6 per cent less than in the same period in 1919; the semi-monthly amount of the pay rolls was $3,070,279, 2.7 per cent more than a year ago, the semi-monthly wage payment in March, 1920, averaged $63.26, or 17.4 per cent more than a year ago.

In the iron and steel industry the number on the pay rolls of 111 establishments in March, 1920, was 170,963 persons, 6.5 per cent more than in the same period in 1919; the amount of the semi-monthly pay rolls was $13,206,450, or 25.5 per cent more than a year ago; the semi-monthly payments in March, 1920, averaged per worker, $77.25, or 17.9 per cent more than a year ago.

On Monotony in Labor

As a contribution to the question often discussed that unrest is partly due to certain so-called monotonous occupations, that this monotony is deadly in its chilling of hope, on the part of the worker largely because he is unable to see the completion of the thing on which he is making only a part, the following is taken from an address made early this year before the alumni of Stevens Institute of Technology by Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Mfg. Co.:

As to monotony; there is just as much fun in laying bricks now as there was 100 years ago; there is just as much variety to be found in digging a ditch as there could have been 1000 years ago or 50 years ago. I would personally rather brake on a modern freight train than to drive a fat yoke of oxen on a dusty New England road as I did back in the 70's.

I think most men would find more enjoyment in running a lathe in a modern machine-shop than he would have found in forging nails by hand as they did 100 years ago.

I think work in a steel mill compares very favorably with the festive brickyard or stone quarry of 1000 years ago or 50 years ago.

If a greater satisfaction with life comes from seeing one's work completed, surely the men employed in the building trades ought to be among the most contented people in the country because a modern skyscraper goes up almost while you look at it.

The place of all others where a man can see the full completion of his labor is on the farm; where he sows the seed, cultivates the crops, can see them grow daily, and harvests them in the autumn. If satisfaction with life comes from contemplation of the fruition of one's work, then there should be an exodus to the farms, but this is the very place where it is found most difficult to get sufficient men to do the work.

The United States Civil Service Commission announces competitive examinations as follows: Supervising metallurgist at $4,000 to $5,000 a year (Form 2118); draftsman, architectural and structural steel, at $1,560 a year, with a temporary increase of $20 a month (Form 1312). Applicants should apply for the form indicated, stating the title of the examination desired, to the Civil Service Commission, Washington, or to the secretary of the United States Civil Service Board at the nearest Custom House.

The Marshall & Huschart Machinery Co., 17 South Jefferson Street, Chicago, has acquired the exclusive agency in Chicago and Milwaukee territory for the line of the National Automatic Tool Co., manufacturer of drilling machines, Richmond, Ind.

American Engineering Standards Committee

What Is Now Being Done, Nationally and Internationally, and How the Work Is Handled—Ship Sections a Late Consideration

SOME of the activities of the American Engineer-Standards Committee were told by its chairman, A. A. Stevenson, Standard Steel Works Co., Philadelphia, in an address made before the National Federation of Construction Industries at Chicago, March 25, as noted in THE IRON AGE of April 1. These tersely put include the following:

A specification for standard pipe threads has been approved—the American Society of Mechanical Engineers and the American Gas Association are sponsors, and are representing America on the subject at an international conference in Paris.

A sectional committee on ship sections is actively at work—the Association of American Steel Manufacturers, the American Society of Civil Engineers, and the Society of Naval Architects and Marine Engineers having accepted sponsorship. The American Bureau of Shipping and the United States Navy have representatives on this sectional committee. Real progress has been made and steps taken toward agreement with the British Standard Association.

The Swiss have requested co-operation on standards for ball bearings. The American Society of Mechanical Engineers and the Society of Automative Engineers have accepted sponsorship, and the formation of a sectional committee is under way.

The British have asked for co-operation on standards for gears—the American Society of Mechanical Engineers has accepted sponsorship and has invited the American Gear Manufacturers Assoication to act jointly with them. A sectional committee will soon be appointed.

Plans are under way for the formation of section committees on standards for screw threads and cylindrical limit gages—these committees to act in co-operation with the British committees. So far as screw threads are concerned, the main committee has a satisfactory understanding with the National Screw Thread Commission.

The American Engineering Standards Committee is in communication with similar organizations in Great Britain, France, Switzerland, Belgium and Holland. The secretary of the committee, Dr. P. G. Agnew, has just arrived in Europe. Before his return, he will be in personal touch with the national organization of Great Britain, France, Belgium, and probably other countries.

While the committee has only been in active operation for a few months, I think it can be safely said that the need of such an organization has been demonstrated and that, rather than interfering with the work of other organizations, it will be of great help in co-ordinating and furthering standardization work—thus helping to place industries at large in a position to increase production. The economic advantage to the country as a whole of any movement that would tend to increase production is so obvious it seems almost superfluous to mention it.

Mr. Stevenson also outlined the objects, organization and procedure of the committee, as follows:

Objects, Organization and Procedure

The objects of the American Engineering Standards Committee briefly stated are as follows:

(1) To unify the methods of arriving at engineering standards, to secure co-operation between various organizations interested in standards in order to prevent duplication of standardization work and promulgation of conflicting standards.

(2) To promulgate rules for the development and adoption of standards.

(3) To receive and pass upon recommendations for standards but not to initiate, define or develop the details of any particular standard.

(4) To act as a means of intercommunication between organizations and individuals interested in the problems of standardization.

(5) To promote in foreign countries the knowledge of recognized American standards.

(6) To co-operate with similar organizations in other countries and to promote international standardization.

(7) To collect and classify information as to existing standards and bodies making same, in the United States and foreign countries, and to act as a bureau of information regarding standardization.

Organization—

(a) Committee proper, or the "main committee," whose functions are chiefly those of an organizing, co-ordinating and steering committee—not defining nor developing the details of any particular standard.

(b) Sectional committees—one for each standard or group of standards—whose function is to prepare the standard or standards in question, under the direction of the most vitally interested organization or organizations, known as sponsor.

(c) The sponsor—any co-operating organization or group of organizations, approved by the main committee, to organize and direct a sectional committee, for the development of any standard or group of standards.

Procedure—

(1) Any standard or group of standards adopted or in process prior to Jan. 1, 1920, may be approved by the main committee, if, in the opinion of the committee it has been developed by a properly constituted committee, or has by actual practice proved its right to become a standard.

(2) When the development of a particular standard or group of standards is proposed the main committee assigns the work to the appropriate organization or organizations as sponsor.

(3) The sponsor then appoints the section committee, subject to the approval of the main committee. The purpose of the approval is merely to assure the comprehensive representation of all interests involved. Fundamentally, the degree of success of any standardization work depends on the comprehensiveness of the representation on the committee developing the standard; in other words, the more broadly comprehensive the representation on the committee, the more broadly will the standard be accepted.

(4) A sectional committee dealing with standards of a commercial character (specifications, shop practice, etc.) must be made up of producers, consumers and general interests—no one of which shall form a majority.

(5) After a standard or group of standards has been prepared and approved by a sectional committee, it is submitted to the sponsor for its approval, and then to the main committee, with its full history. When it is approved by both the sponsor and the main committee, the standard or group of standards in question becomes an "American standard."

(6) When the report of any sectional committee is being considered by the main committee, a sponsor may appoint two representatives to sit with the main committee.

(7) The scrutiny of a standard by the main committee is to make sure that the proper procedure was pursued, that the vote of approval was approximately unanimous, and that the standard is consistent with other related standards—the main committee not to pass upon the details.

(8) After approval by the main committee, the standard is published by the sponsor under appropriate title, and over the statement "Approved by the American Engineering Standards Committee."

Two additional members have recently been elected to membership of the American Engineering Standards Committee. They are the National Safety Code Group and the Fire Protection Group. The names of several other organizations are now under consideration by the Committee.

At a safety code conference held in Washington Dec. 8, 1919, a resolution was passed expressing the sense of the conference that safety codes for general use should be prepared according to the procedure of the American Engineering Standards Committee. A second resolution requested the American Engineering

Standards Committee to ask the International Association of Industrial Accident Boards and Commissions, the National Safety Council, and the Bureau of Standards to form a safety code committee, which should suggest a list of safety codes and recommend sponsors for same. The American Engineering Standards Committee took a favorable action upon this request. The committee appointed has made a progress report suggesting a list of 37 codes.

Summary of Constitution

(1) The committees shall be composed of not more than three representatives each from the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the American Society for Testing Materials, the Government Departments of War, Navy and Commerce, and from each of such other organizations or groups of organizations of national scope as may be approved.

(2) The number of representatives any organization or group of organizations may appoint shall be determined by such consideration as: Volume, character and importance of its standardization work, together with its standing and total membership.

(3) Any application for membership shall be considered by the American Engineering Standards Committee, and if approved by three-fourths of those present and voting, shall be submitted with recommendations to the governing boards of each organization represented on the committee. The recommendations to stand approved unless formal objection from more than one-fourth of the organizations is received within ninety days.

(4) Initially each organization or group of organizations shall appoint its first representative to serve three years, the second to serve two years, and the third to serve one year. After the first year all appointments shall be for three years.

(5) The committee shall elect from its membership a chairman and vice-chairman who shall not be representatives of the same organization or group of organizations, and shall serve for one year. These officers shall not serve for more than three consecutive years.

(6) A secretary, who shall not be a member of the committee, shall be engaged by the executive committee.

(7) At its annual meeting the committee shall elect from its membership an executive committee consisting of one representative of each organization represented on the committee and may delegate to it any of its powers except that of approving "Recommended Practices," "Tentative Standards," or "American Standards."

(8) The committee shall hold at least four regular meetings a year.

(9) The committee shall formulate rules under which committees to create standards shall be constituted and organized and shall receive and pass upon recommendations for standards which may be submitted by a competent body, to be known as the sponsor.

(10) Any proposed standard submitted to and approved by the committee shall be known as a "Recommended Practice" or a "Tentative Standard," and when, in the opinion of the committee, after approval by the sponsor, it has proved its suitability it shall be known as an "American Standard."

(11) Approval as "Recommended Practice" or "Tentative Standard" shall require the affirmative vote of at least three-fourths of the committee; the advance of status to "American Standard" shall require an affirmative vote of at least 90 per cent of the committee; such votes shall be by letter ballot.

(12) A "Recommended Practice" or a "Tentative Standard" may be revised at intervals of not less than a year and an "American Standard" may be revised at intervals of not less than three years.

(13) Each organization appointing representatives shall pay annual dues of $500 for each representative.

(14) The committee may adopt by-laws in accordance with this constitution.

(15) Amendments to constitution must be proposed in writing thirty days before action by committees. If approved by three-fourths of those present they shall be referred to the organizations represented on the committee and shall become operative only when they have been approved by three-fourths of such organizations.

Machinists' Strike Expected in Cincinnati

CINCINNATI, April 27.—Union machinists of Cincinnati, numbering 12,000, have completed the taking of a strike vote to enforce their demands for a 25 per cent increase in wages, commencing May 1. According to union officials, 99 per cent of the membership voted in favor of a walkout on May 1. A final decision will be reached at a meeting on Wednesday night. Union officials claim that several of the larger machine tool manufacturers have expressed their willingness to grant the increased scale, but the names of these concerns have not been divulged.

The manufacturers are firm in refusing to discuss wage questions with representatives of the unions, but are understood to be willing to take up any grievances with their own employees. In the event of a strike being called, which now seems certain, the manufacturers claim that they will still have sufficient men to keep their plants operating. Strikes have already been declared in several manufacturing plants, and it is estimated that about 700 machinists are out.

Ready for American Business

BIRMINGHAM, ALA., April 26.—Agents of the Gulf States Steel Co. just back from South America report the East Coast particularly as ready to do a large business with American manufacturers of every kind. The company which sold to 32 countries last year, will do considerable business with South America. The company's agent reports the South Americans are especially anxious to do business with the manufacturers direct.

The Haynes Stellite Co., Kokomo, Ind., has been merged with the Union Carbide & Carbon Co., New York. The plant will remain in Kokomo. Elwood Haynes, president of the Stellite company, and J. C. Patten, secretary, will not be actively connected with the management hereafter. The deal is said to have involved $4,000,000.

Employees Appeal to President Wilson

YOUNGSTOWN, OHIO, April 27.—The Mahoning Valley Employees' Association has passed a resolution asking President Wilson to act to relieve unemployment in the Youngstown district, caused by the railroad strike. It is pointed out that the Mahoning Valley, which produces 25 per cent of the world's finished steel, is harder hit than any other district, and 40,000 steel workers are idle because of a strike of a minority of the railroad employees. It is feared idleness will be responsible for other ills of a more serious nature in the Valley. Roadmen of the Erie failed to report for work to-day.

Boiling Rate Advanced

YOUNGSTOWN, OHIO, April 27.—The boiling rate for May and June advanced to $14.88 per ton on a 3c. card as a result of the bi-monthly examination of sales sheets between representatives of the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers. The March-April rate of $13.88 per ton was based on a 2.70c. card. The new rate is 170 per cent above the base. The examination to fix the wages of sheet and tin mill workers for the May-June period will be held May 10 at Scranton, Pa., during the annual convention of the Amalgamated Association.

The annual convention of the Carbo-Hydrogen Co. of America was held on April 16 and 17 at the general offices of the company in the Benedum-Trees Building, Pittsburgh. The presiding officer was J. R. Rose, vice-president of the company. Several addresses were delivered and papers read by officials and department heads, all dealing with the best ways and means for taking care of the company's business of selling carbo-hydrogen gas for cutting metals and carbo-apparatus. A banquet was the chief entertainment feature.

Iron and Steel Markets

PLANT SHUTDOWNS

Dependent Industries Now Hurt by Railroad Strike

Other Labor Troubles Brewing — Independent Mill Sells Bars at 2.35c.

How great a blow the iron and steel industry received through the railroad strike is only now becoming really apparent. While more blast furnaces are in operation than a week ago, and broadly speaking mill operations have been bettered, the dislocation of shipping has brought about the closing of consumer plants. In the Chicago district several hundred thousand employees, chiefly of dependent industries, are idle, and 40,000 steel workers in the Youngstown district are now unemployed. Two of our largest automobile factories have practically suspended production, putting 40,000 men out of work.

Much of what success has been achieved in freight movements has been due to sending whole trainloads to important centers. Some consumers as a result have gotten more than their expected quotas, while others meanwhile must do without. Motor trucks have helped in carrying both coke and pig iron for even 200-mile distances.

While inroads have been made in some accumulations of finished products at mills, in other cases the glut has been increased. At the plants of the American Sheet & Tin Plate Co. on Tuesday there were 77,000 tons of sheets and tin plate in storage, and the National Tube Co. had a total of 50,000 tons of material awaiting transportation.

The market is not merely handicapped by the forestalling of deliveries and the consequent forcing into the third quarter of much that should be shipped in the second—and all in the face of practically negligible stocks in the hands of consumers and distributers—but it is clouded by further threatening labor difficulties. To add to the unsettlement of the contemplated strike on May 1 of molders, machinists and other crafts in some of the Middle Western cities is the continued labor agitation among the steel workers in the same sections. It is not clear that any headway is being made among the iron and steel workers, but meanwhile no great buying activity can be expected.

The price situation is naturally strong. Conditions have not been conducive to speculative buying and world needs are still unsatisfied. And yet the exceptional transactions are noted in which an independent mill has sold a large tonnage of steel bars to an agricultural implement maker for the last half at 2.90c., Pittsburgh, and has subsequently made quotations at 2.35c., the price of the Steel Corporation. Another mill has met the Steel Corporation price on shapes of 2.45c.

Demand for pig iron has been confined largely to efforts to buy small amounts for spot shipment to tide over the railroad strike emergency. Sales of fair size have been made in Eastern territory for last half delivery and considerable iron could have been sold for export, but furnaces are showing a disposition to conserve output which may be needed for domestic melters. In the South the market seems to be firmly fixed at $42 except for occasional lots sold by the Tennessee company, which is now virtually out of the market, but which has been noted as a factor in Baltimore and Philadelphia.

Railroad and mine estimates of the shipment of Lake Superior ore this season now indicate a movement of about 70,000,000 tons, which is 10,000,000 tons more than recently estimated by shippers at Cleveland. The season does not, however, open auspiciously, for, with the exception of one dock at Superior, the sailing of vessels at the head of the Lakes has been prevented by a strike of dock employees, who demand a 40 per cent increase in wages. This labor trouble has delayed the beginning of operations at open-pit mines.

Further railroad purchases include 3100 car bodies for the Baltimore & Ohio, which has also bought 10,000 tons of shapes and plates for the remainder of the year. The Northern Pacific is to buy about 90 locomotives, the Illinois Central 12,000 tons of material for car repairs, the Chicago & Northwestern 1000 and the Nickle Plate 500 cars and the Southern Pacific 5600 tons of shapes and 2700 tons of universal plates.

For a pipe line for Seattle, Wash., 16,000 tons of plates will be required. Fabricated steel business has tapered off, but owing to general conditions fabricating plants cannot all operate at their recent rates.

Production of sheets, conspicuously an article in great demand, is now probably not over 50 per cent of normal.

Late export sales prove anew the urgency of needs. England has bought a lot of 5500 tons of ship plates and Holland 2400 tons, both at 4c., Pittsburgh, and a British offer of $72 a ton for 10,000 tons of billets, part 2 in. and part 3 in., has been made. On 6000 tons of 4-in. billets $68.50 was paid. Cancellation of some Japanese business, an aftermath of the financial troubles in Japan, has put a limited tonnage of steel on the American market but at full prices, while the cable tells of cancellations of tin plate and galvanized sheets in Great Britain.

A sale of 40,000 tons of American rails to Europe has been made at a delivered price lower than the British home price.

Fresh American shipyard inquiries are under consideration, one involving 4000 tons and the other 25,000 to 35,000 tons. A low quotation is claimed on the larger amount.

Pittsburgh

PITTSBURGH, April 27.

The railroad situation in the Pittsburgh district, also in the Youngstown, Wheeling, and other districts, is most deplorable, and is worse than last week in spite of the optimistic reports being printed in the daily press about the improvement in the situation, and the glowing reports also being given out by the railroad officials as to the number of men going back to work, better movement of freight and the increase in the number of empty cars available at the mills for loading. To-day operations of the blast furnaces and steel plants in the Pittsburgh district are much lighter than a week ago and the outlook for any improvement this week is bad. Some plants are still running nearly full, but are not moving their product. They are simply

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 27, 1920	Apr. 20, 1920	Mar. 30, 1920	Apr. 29, 1919
No. 2 X, Philadelphia‡	$47.05	$47.05	$46.05	$31.90
No. 2, Valley furnace†	43.00	43.00	42.00	26.75
No. 2 Southern, Cin'ti†	**45.60**	43.60	43.60	30.35
No. 2, Birmingham, Ala.†	**42.00**	40.00	40.00	26.75
No. 2 furnace, Chicago*	43.00	43.00	43.00	26.75
Basic, del'd, eastern Pa.	44.80	44.80	44.80	29.65
Basic, Valley furnace	43.00	43.00	42.00	25.75
Bessemer, Pittsburgh	43.90	43.90	43.40	29.35
Malleable, Chicago*	43.50	43.50	43.50	27.25
Malleable, Valley	43.00	43.00	43.00	27.25
Gray forge, Pittsburgh	42.40	42.40	42.40	27.15
L. S. charcoal, Chicago	57.50	57.50	56.50	38.85
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$55.00	$55.00	$55.00	$45.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	47.00
Bess. billets, Pittsburgh	60.00	60.00	60.00	38.50
O.-h. billets, Pittsburgh	60.00	60.00	60.00	38.50
O.-h. sheet bars, P'gh.	80.00	80.00	80.00	42.00
Forging billets, base, P'gh.	80.00	80.00	80.00	51.00
O.-h. billets, Philadelphia	64.10	64.10	64.10	42.50
Wire rods, Pittsburgh	70.00	70.00	70.00	52.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	4.25	4.25	4.25	2.595
Iron bars, Pittsburgh	4.25	4.25	4.25	2.35
Iron bars, Chicago	3.75	3.75	3.75	2.50
Steel bars, Pittsburgh	3.75	3.75	3.75	2.35
Steel bars, New York	4.02	4.02	4.02	2.62
Tank plates, Pittsburgh	3.75	3.75	3.75	2.65
Tank plates, New York	4.02	4.02	4.02	2.92
Beams, etc., Pittsburgh	3.25	3.25	3.25	2.45
Beams, etc., New York	3.52	3.52	3.52	2.72
Skelp, grooved steel, P'gh.	2.75	2.75	2.75	2.45
Skelp, sheared steel, P'gh.	3.00	3.00	3.00	2.65
Steel hoops, Pittsburgh	5.00	5.00	4.00	3.05

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire. Per Lb. to Large Buyers:	Apr. 27, 1920 Cents	Apr. 20, 1920 Cents	Mar. 30, 1920 Cents	Apr. 29, 1919 Cents
Sheets, black, No. 28, P'gh.	5.50	5.50	5.50	4.35
Sheets, galv., No. 28, P'gh.	7.00	7.00	7.00	5.70
Sheets, blue an'l'd, 9 & 10	4.50	4.50	4.50	3.55
Wire nails, Pittsburgh	4.00	4.00	4.00	3.25
Plain wire, Pittsburgh	3.50	3.50	3.50	3.00
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.10
Tin plate, 100 lb. box, P'gh.	7.00	7.00	7.00	7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$37.00	$37.00	$37.50	$21.00
Carwheels, Philadelphia	40.00	40.00	42.00	22.00
Heavy steel scrap, P'gh.	25.00	25.00	27.50	15.00
Heavy steel scrap, Phila.	24.00	24.00	25.00	15.00
Heavy steel scrap, Ch'go.	23.50	23.50	24.50	15.75
No. 1 cast, Pittsburgh	32.00	32.00	34.00	18.00
No. 1 cast, Philadelphia	38.00	38.00	38.00	22.00
No. 1 cast, Ch'go (net ton)	37.00	37.00	38.00	20.00
No. 1 RR. wrot, Phila.	35.00	35.00	35.00	21.00
No. 1 RR. wrot, Ch'go (net)	27.00	27.00	28.00	15.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$11.00	$11.00	$6.00	$3.50
Furnace coke, future	11.00	11.00	6.00	4.00
Foundry coke, prompt	11.00	11.00	7.00	4.00
Foundry coke, future	11.00	11.00	7.00	4.50
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	19.25	19.25	19.25	15.50
Electrolytic copper, N. Y.	**19.25**	19.00	19.00	15.25
Zinc, St. Louis	*8.00*	8.15	8.50	6.02½
Zinc, New York	*8.35*	8.50	8.85	6.37½
Lead, St. Louis	*8.40*	8.50	8.75	4.70
Lead, New York	*8.75*	8.85	9.00	4.95
Tin, New York	*60.50*	62.25	63.75	72.50
Antimony (Asiatic), N. Y.	11.00	11.00	11.50	6.62½

The above prices are for domestic delivery and do not necessarily apply to export business.

loading it in cars and allowing it to stand on the tracks. On Tuesday the American Sheet & Tin Plate Co., from reports received from all its sheet and tin plate mills, stated that its hot tin plate mill shipment was about 15 per cent and in sheets about 14 per cent. Its only two important plants that are making shipments are Gary and Elwood, Ind., and these are full train shipments that go right through to destination without switching. This company has about 77,000 tons of sheets and tin plate piled in warehouses and on Tuesday had 414 cars loaded at its various works, but standing still with little prospect of being moved this week. The National Tube Co. started since last week its idle blast furnace at Wheeling, also its idle furnaces at Continental and Pennsylvania works, this city, and is getting out nearly normal output but is shipping practically nothing. This company has more than 50,000 tons of material at its various plants, either loaded or in stock, that is not going out to consumers who need it badly. The American Sheet & Tin Plate Co. is losing production of 50,000 boxes of tin plate per day, which cannot be made up, this coming at a time when production was never needed so badly as it is right now, and it is a serious question whether enough can stock can be made to meet the needs of the can makers this summer.

On Monday this week, the Carnegie Steel Co started one Columbus and one Mingo Junction blast furnace, but still has 18 stacks either out of blast or banked directly on account of the railroad strike. The company is operating 32 blast furnaces and has 27 stacks idle. In its various steel works, the Carnegie Steel Co. is getting out an average production to-day of about 66 per cent of normal. The main plants of the company on the Monongahela River, these being Homestead steel works, Duquesne blast furnaces and steel works, Clairton blast furnaces and steel works, and Edgar Thomson blast furnaces and steel works, are served by the Union Railroad and are in fairly good shape to receive material and make shipments.

In addition, the Carnegie company has the Bessemer & Lake Erie Railroad to serve its Pittsburgh plants, so that its operations at its local plants are fairly good. In the Wheeling, Youngstown, New Castle, Sharon and Columbus districts the Carnegie company is on the same footing as the other steel companies, and operating and shipping conditions are not nearly so good as in this district.

The Johnstown, Pa., plants of the Cambria Steel Co. are served entirely by the main line of the Pennsylvania Railroad, and are in pretty good shape as regards receiving raw materials and making shipments of finished products. None of the blast furnaces, steel works or finishing departments of the Cambria Co. is closed, operations being about normal.

The Jones & Laughlin Steel Co. is still able to keep its blast furnaces and steel works in this city and in Aliquippa in operation, and shipments are fairly good. E. W. Mudge & Co. have been able to get shipments of coke through and are operating their Ella furnace at West Middlesex, Pa., but the Claire furnace at Sharpsville is still banked.

The Shenango Furnace Co. is operating No. 1 furnace at Sharpsville, but its No. 3 and No. 4 stacks are idle. It seems likely that there will be further reduction in operations of both blast furnaces, steel works and finishing plants in the Pittsburgh and nearby districts within a few days, unless there comes very quickly a material clearing up of the strike situation. The Pittsburgh & Lake Erie Railroad and the Baltimore & Ohio are both down tight as regards receiving freight shipments, while the Pennsylvania Railroad

and the Baltimore & Ohio will, in some cases, receive solid trainloads of freight that run through to destination without the trains being broken up. Much criticism is expressed here over the slow manner in which the committee appointed by President Wilson at Washington is handling the railroad situation, the claim being that very little has been done to relieve the situation, which in the Pittsburgh district is worse than it has been at any time since the strike started. Pittsburgh is also threatened with a street car strike, to start at midnight, April 30, and the general labor situation here is very bad.

While the present labor troubles continue little or no effort is being made to do business. The steel interests do not care to take on more commitments until the railroad strike has cleared up, and even if it were settled this week, which is not at all likely, it would be several weeks before transportation conditions would be anything like normal. There is an acute shortage in the supply of everything, and almost any prices can be had, if deliveries can be made, which is not possible except in very few cases.

Pig Iron.—Producers of pig iron are not making any efforts to sell, consumers are not trying to place any contracts, the entire efforts of both being made to get through shipments of pig iron already sold. Merchant furnaces in the two valleys are shipping practically nothing and stocks in consumers' yards are pretty well used up. The Carnegie Steel Co. is reported to be pretty well fortified with iron and is not suffering for metal at any of its plants. Only a few small lots of pig iron have been sold and for indefinite delivery. Embargoes are on everywhere and practically no iron is moving out from any of the producing centers. No Southern iron is coming into this market, and there will be little done either way until the railroad strike is settled. There is no change in prices to note this week.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh districts being $1.40 per gross ton:

Basic	$43.00
Bessemer	42.50
Gray forge	$41.00 to 42.00
No. 2 foundry	43.00
No. 3 foundry	42.50
Malleable, Valley	43.50

Billet and Sheet Bars.—The steel plants of the Carnegie Steel Co., in the Pittsburgh district, are running pretty well, but in the Youngstown, New Castle, Wheeling and Sharon districts are operating only at 50 per cent or less. In Youngstown all the steel plants are practically idle, with one exception, and this plant may go down this week. No attempt is being made by the mills to sell steel, and consumers are not trying to buy.

We now quote 4 x 4-in. soft Bessemer and open-hearth billets at $38 to $60; 2 x 2-in. billets, $42; Bessemer sheet bars, $42 to $70; open-hearth sheet bars, $42 to $80, and forging billets, ordinary carbons, $80 to $85 base, all f.o.b. Youngstown or Pittsburgh mill.

Ferroalloys.—The local market is quiet, due to the railroad strike, and with so many steel plants running at 50 per cent or less, consumption of ferromanganese is very much curtailed. Prices are firm, but little material is being sold, and likely will not be until the strike is settled.

We quote 76 to 80 per cent domestic ferromanganese $200 for last half delivery and $250 for prompt delivery, with a reduction of $1.50 to $1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at $85 to $90 and 18 to 22 per cent spiegeleisen at $62 to $67, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, $56.50; 10 per cent, $59.50; 11 per cent, $62.50; 12 per cent, $66.10. We quote 6 per cent silvery iron, $45.75 to $46.25; 7 per cent, $50 to $50.50; 8 per cent, $52 to $52.50; 9 per cent, $54 to $54.50, and 10 per cent $56.50 to $57. An advance of $3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of $2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which has a uniform freight rate of $2.90 per gross ton for delivery in the Pittsburgh district.

Structural Material.—The contract for the Cincinnati Southern Railroad bridge at Cincinnati, about 15,000 tons, has not been placed at this writing. It is expected to be awarded this week. The McClintic-Marshall Co. has taken a pier shed at Gowanus Bay, Brooklyn, 1500 tons. Local fabricators report inability to make shipments on account of the railroad strike, and are operating their fabricating plants at a greatly reduced rate. Many cars of fabricated material are loaded, but are standing on tracks in the yard, and may remain there for some time. The Carnegie Steel Co. price on plain material, up to 15 in., remains at 2.45c., but another local concern is quoting 3.10c. to 3.25c. to regular customers only, and for indefinite delivery. Another producer of plain material, outside the city, is quoting 4c., Pittsburgh, and is firmly holding to that price on any sales it makes.

Plates.—Nothing is being done in the way of placing orders for cars by the railroads during the strike, and plate mills are down to 50 per cent or less in operation. Two local plate mills report they have had close to 100 cars loaded with material for more than a week, but have not turned a wheel.

We quote sheared plates of tank quality, ¼ in. and heavier, at 2.65c. to 3c. for very indefinite delivery, while prices on ¼-in. and heavier plates, named by mills that will agree to ship out in three to four months, range from 3.50c. to 4c. at mill.

Steel Rails.—The Carnegie Steel Co. is sold up fully for this year on both light and standard rails and is adhering strictly to the March 21, 1919, prices. These prices are 2.45c. for 25-lb. to 45-lb. sections; 2.49½c. for 16 and 20-lb. sections; 2.54c. for 12 and 14-lb. sections and 2.58½c. for 8 and 10-lb. sections. On standard sections the company is quoting $45 for Bessemer and $47 for open-hearth stock. Prices of outside rail mills are much higher, one leading mill quoting 25 to 45-lb. sections at 3.50c.; 16 and 20-lb. sections, 4.50c.; and 12 and 14-lb. sections, 9c., at mill. This concern also reports it is not making any standard section rails and is practically sold up on light rails for this year.

Sheets.—The railroad strike is playing havoc with operations of sheet mills and on Tuesday this week, American Sheet & Tin Plate Co. plants were down to a general operation of only about 15 per cent. Some independent interests are doing a little better, but it is safe to say that general production of sheets at this time is not over 50 per cent of normal, and it is likely a good deal less. All the mills have very heavy stocks either piled in warehouses or loaded on cars ready for shipment, but very few are being moved by the railroads. At some plants of the American Sheet & Tin Plate Co., shipments are fairly good, while at others not a ton is being moved out. Nearly every concern using sheets is badly crippled, and the situation is likely to get worse.

We quote No. 28 gage box annealed one-pass black sheets at 4.35c. to 6.50c.; No. 28 galvanized, 5.70c. to $8.50c., and Nos. 9 and 10 blue annealed at 3.55c. to 6c., the lower prices named being the March 21 schedules, which are still named by the leading interest, while the higher prices represent a fair range of quotations by the independent mills.

Tin Plate.—The American Sheet & Tin Plate Co. is down to about a 15 per cent operation in tin plate, some of its plants being entirely closed and others working from 25 to about 40 per cent. Some independent mills are still operating, using up what steel they had on hand, but not making any shipments. The total loss in production of tin plants, due to the railroad strike, is close to 100,000 boxes per day and it can never be made up. Some independent concerns have not sold any tin plate for last half except to a few favored customers, and some sales have been made at $8 to $8.50 per base box, to go into products other than food containers.

We now quote tin plate to domestic consumers for remainder of the year delivery at $7 per base box, stock items $8.50 to $9, and for export $11 to $12 per base box, all f.o.b. Pittsburgh.

Wire Rods.—The inquiry is active, but local makers are not selling rods, their output being very greatly restricted due to the railroad strike. We quote soft Bessemer and open-hearth rods at $70 to $75 and high carbon rods at $80 to $100 at mill, the carbon content determining prices on the latter.

We quote wire nails at $3.25 base, this being the price of the American Steel & Wire Co., and $4 base on the new card recently issued by four or five of the independent mills. We quote bright basic wire at $3, this being the price of the American Steel & Wire Co., and $3.50, this being the price of most of the independent mills.

Wire Products.—None of the local makers is taking on any new business in wire and wire nails, largely because of the railroad strike, and also for the reason that their output is fully sold up over the next four to six

months. The American Steel & Wire Co. continues to quote wire nails for indefinite delivery at $3.25 base, and plain wire at $3 base, while three independent mills quote wire nails at $4 base and plain wire at $3.50 base, and still another interest, when it sells any wire nails or wire, quotes wire nails at $4.50 base, and plain wire at 4c. base. Prices on wire products are given in detail on page 1275.

Iron and Steel Bars.—The railroad strike has cut down production of both iron and steel bars to 50 per cent or less of normal. Mills are not taking on any new business until the strike situation is cleared up while consumers are more concerned in trying to get delivery on orders already placed than in making new contracts. One leading maker of steel bars is quoting at 4c. minimum, but will not promise delivery inside of eight to 10 months.

We quote steel bars rolled from billets at 2.35c., this being the price of the Carnegie Steel Co. for very indefinite delivery, likely not before first quarter of next year. Other mills rolling steel bars from billets quote from 3c. to 4c. at mill, prices depending entirely on the buyer and the delivery wanted. The demand for concrete reinforcing steel bars is fairly active, and we quote these, when rolled from billets, at 4c. to 4.25c., and from old steel rails at about 3.50c. at mill. We quote common iron bars at 4.25c. to 4.50c. and refined iron bars at 4.50c. to 5c. in carloads, f.o.b. mill, Pittsburgh.

Cold-Rolled Steel Bars.—Output has been very seriously restricted by the railroad strike. Local makers say they are filled up for the next four to six months and will not take on any more new business, owing to general unsettled conditions. Very few shipments are going forward and consumers are suffering severely for lack of material, especially the automobile trade. We quote cold-rolled steel bars at $4.10 to $4.25 per 100 lb. to regular customers only, for indefinite delivery, f.o.b. at mill, premium prices range from 5c. to 7c. at mill.

Hot-Rolled Strip Steel.—Local makers say they are not taking on any new business during the railroad strike, and will not until it is cleared up. Minimum prices are 5½c. to 7c. per lb. at mill to regular customers. Truck delivery is being resorted to by local makers, and one local concern recently sent about 400 tons to Detroit in this way.

Cold-Rolled Strip Steel.—The minimum price to regular customers of three local makers is reported to be 8½c. per lb., but sales of small lots have been made at as high as 12c. per lb. for prompt delivery. Several local makers are using trucks to make deliveries to nearby customers.

Hoops and Bands.—Local makers say they are not taking on new business, due to the railroad strike, and are sold up for three to four months. The Carnegie Steel Co. is still quoting 3.05c. on hoops and bands, usual extras, for this year delivery, while another local maker is quoting 5½c. for such delivery as it can make, and states it is having no trouble whatever to enter all the orders it cares to take at that price.

Cotton Ties.—Prices for this season on cotton ties have not been announced by the makers, but likely will be in a short time.

Spikes.—Nothing is being done in the way of placing orders by the railroads, which have their hands full at this time with the strike. Two local makers report they are sold up on standard spikes from four to six months.

We quote standard spikes, ½ to 9/16 in. and larger, $4 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ⅜ in. and 7/16 in., $4.50; 5/16 in., $5; boat and barge spikes, $4.25, f.o.b. Pittsburgh. Tie plates, $3 to $4 per 100 lb.

Boiler Tubes.—The National Tube Co. reports that all its plants making boiler tubes, also seamless tubes, are in operation, but shipments are very light. The demand for locomotive tubes is fairly active, and for stationary tubes has been very heavy for some time. Discounts on iron and steel tubes are given on page 1275.

Iron and Steel Pipe.—Local pipe mills are operating fairly well, but are making practically no shipments, output being either piled in the mill yards or loaded cars, which are not being moved. Mills are still refusing to quote on new orders, but it is said the oil and gas lines placed early in the year have pretty well cleaned up, the heavy demand now being for oil well tubular supplies. Discounts on iron and steel pipes are given on page 1275.

Coke.—Sales of standard grade blast furnace coke are being made all the way from $10.50 to $12 per net ton at oven. A sale of 10 cars was made at the latter price yesterday. Output of coke is very much restricted by the railroad strike, but it has been possible to get solid trains through to certain points, but they are greatly delayed on the road. Some plants in the Connellsville region are shut down entirely and will remain idle until the strike is settled. We quote standard grades of blast furnace coke at $11 to $12 and 72-hr. foundry coke at $12 to $13 per net ton at oven.

Old Material.—The local coke market is practically stagnant, no effort being made by dealers to make sales, while consumers are not interested in the market, having all they can attend to in trying to get material in already bought but held up by the railroad strike. The scrap list of the Pennsylvania Railroad dated April 26 is now in the hands of dealers for bids. The list is heavy, the main items being 500 gross tons of angle bars, 1100 tons of steel couplers and knuckles, 900 tons of uncut structural and bridge steel, 1500 tons of standard section 50-lb. steel tee rails, 700 tons of sheet scrap, 2500 tons of heavy melting steel, 1200 tons of borings and turnings, 2300 tons of old wheels, 1300 tons of No. 2 wrought scrap, 1400 tons of destroyed steel cars and 2175 tons of unsorted scrap. Bids are to be in on May 4 and awards are to be made by mail on May 7. No sales of scrap are being made in this market on which to base prices, which are purely nominal.

We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$25.00 to $25.50
No. 1 cast for steel plants	34.00 to 35.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	32.00 to 33.00
Compressed steel	22.00 to 22.50
Bundled, sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	16.00 to 16.50
Bundled sheet stamping	15.00 to 15.50
No. 1 busheling	17.50 to 18.00
Railroad grate bars	26.00 to 26.50
Low phos. melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	30.00 to 30.50
Railroad malleable	30.00 to 30.50
Iron car axles	37.00 to 38.00
Locomotive axles, steel	34.00 to 35.00
Steel car axles	31.00 to 32.00
Cast iron wheels	40.00 to 41.00
Rolled steel wheels	29.00 to 30.00
Machine-shop turnings	15.50 to 16.00
Sheet bar crop ends (at origin)	28.00 to 28.50
Heavy steel axle turnings	20.00 to 21.00
Heavy breakable cast	32.00 to 32.50
Cast iron borings	17.50 to 18.00
No. 1 railroad wrought	31.00 to 32.00

New Installations of Greaves-Etchells Furnaces

The Electric Furnace Construction Co., Philadelphia, announces the sale of a 1-ton Greaves-Etchells electric furnace to the Wayne Steel & Iron Co., Croghan, N. Y. It also states that a 20-ton and two 10-ton furnaces of the same type have been sold to Swedish and French steel companies respectively for making steel ingots and that a Belgian company has bought a ½-ton furnace for making steel castings. A Sheffield company has contracted for a ½-ton furnace for tool steel and a company at Newcastle, England, will install a 1-ton furnace for steel castings. It is interesting also to note that the metallurgical section of Sheffield University has decided to install a ½-ton furnace of this type for experimental work on tool steel and on iron melting.

Arthur C. McKee & Co., engineers and contractors, 2422 Euclid Ave., Cleveland, have been awarded a contract for redesigning and remodelling the furnace top of the Bethlehem Steel Co.'s "B" blast furnace at Lebanon, Pa. This furnace will be equipped with a modern McKee revolving stock distributor, new gas seal, and in fact practically a complete new top platform.

Chicago

CHICAGO, April 27.

Furnace and mill operation in this district is about the same as a week ago. The leading interest has shown the most improvement, having refired three banked blast furnaces, one each at Gary, South Chicago and Joliet. It now has six active stacks at Gary, six at South Works and three at Joliet. By using about 45 per cent scrap in its open hearths it has been able to increase its finished output to 65 per cent of normal. What little improvement has been achieved in the transportation situation is due largely to the movement of raw material and finished products in train lots.

The market is clouded not only by the present strike, but further threatening labor difficulties. It is known that the molders, machinists and other crafts contemplate striking May 1. Labor agitation among the steel workers has been resumed at Gary, Indiana Harbor and Waukegan. The radical character of speeches at Waukegan resulted in an appeal to the attorney-general of Illinois. At Indiana Harbor hand bills advertising a mass meeting read in part as follows:

"To meet the high cost of living you must get higher wages. To live you must have shorter hours. To secure power and benefits you must organize in your unions."

At Gary the old steel strike council has been revived and is fostering the one big union idea. It is not yet clear whether these efforts are making any headway among iron and steel workers.

The market is overshadowed by the transportation tie-up and the conditions resulting from it. Some of the most competent observers are baffled by the complexities of the situation and are unwilling to venture a prediction as to the future course of business. While many are speculating as to what will happen when the railroads are back to normal, not a few have overlooked the fact that the strike perhaps has had an important influence on the demand. Although no accurate statistics are available, it is estimated that several hundred thousand workmen in the iron and steel and dependent industries have been thrown out of employment. It is definitely known that one large automobile manufacturer has laid off 10,000 out of 19,000 employees while another has laid off 30,000. Estimating their average wages at $10 a day, a potential daily purchasing power of $400,000 has been shut off. This, it should be noted, represents a permanent loss and will reduce the demand for all commodities these men buy as long as they must draw on past savings or credit to pay for present necessities. When the lost buying power of all labor now idle is considered, it constitutes an economic factor of no mean consequence. Of more immediate import in the steel market is the effect of the strike on the present demand for iron and steel products. The idleness of plants means a reduction in consumption which perhaps is balanced by curtailed production by mills and furnaces. At the same time, the financial strain on consumers and sellers is severe. Shipments delayed in transit represent large amounts of idle money upon which interest continues to accrue. Many manufacturers have large sums tied up in finished products which cannot be delivered to buyers. One good-sized western consumer of steel has goods ready for shipment equal in value to the entire capitalization of the company. Considerable money is also tied up in products falling short of completion only to the extent of a few minor parts which cannot be secured under present conditions. Because of this situation, mills are beginning to experience difficulty in collections, particularly in the case of smaller customers. If, as is feared in some quarters, the present strike will be followed by others in different industries, the complications which may arise may indeed have a far reaching effect on business. While it is everywhere recognized that the potential needs of this country and of the world are great, the relation between supply and demand is of present significance only. If, because of labor difficulties demand is curtailed for any length of time, a shortage may be translated into an oversupply regardless of what the potential demand may be.

Considerations such as those just outlined are receiving the attention of the mills at the present time and have been conducive to greater caution in selling. The leading local independent has decided not to close contracts for last half delivery on the grounds that conditions justifying certain prices at this time may be of temporary duration. If increased costs or other causes result in a rising market, contracts would be filled at a loss, whereas if prices should fall it would be difficult to force buyers to accept delivery. Therefore new business will be confined to specific orders for shipment not beyond three months hence. The prices which will govern these orders have not been determined.

Pig Iron.—Although transportation difficulties have curbed buying and interfered with shipments, they have at the same time created an active demand for spot materials to take care of immediate needs arising out of failure to secure delivery on previous orders. The movement of single carloads is still exceedingly difficult, and for this reason resort has been made to shipment in solid train loads. In one recent instance a train lot of iron was moved successfully for a distance of 150 miles from furnace to users. Smaller lots are being transported by motor truck. In one case a melter sent a truck 200 miles to secure 10 tons of iron. The prompt demand for coke is even stronger. In this product also shipments by train lots have been made, whereas movement by truck is exceedingly common. Foundries in Madison and Stoughton, Wis., for example, have sent trucks to Milwaukee for coke. While the prompt demand for iron and coke is the feature of the market, buying ahead is more in evidence than a week or two ago. One seller of Southern iron has booked 3000 tons of foundry for second and third quarter delivery, within the past few days. This brought $42 base, Birmingham, 1000 out of the 3000 tons constituting a single order. A Rockford, Ill., melter is in the market for 1000 tons of foundry for delivery within three months. On Southern foundry, the ruling price now seems to be $42 base, Birmingham, although some furnaces are asking $43 and $44. Spot foundry is bringing $43, Birmingham. Apparently all makers who were quoting $40 have withdrawn from the market. While production of merchant iron in this district has fallen off on account of the uncertain coke situation, all of the stacks of the leading producer are still in blast. Because of the current losses in output, it is doubtful whether this maker will be able to take on any further commitments this year. This interest's local by-product coke plant is now operating at little better than 50 per cent of capacity, while its Joliet and Milwaukee plants are on 25 per cent and 40 per cent bases respectively. Beehive coke sold in this territory is bringing $12 to $12.75, f.o.b. Connellsville, on prompt shipments, and $12 on last half purchases. A Tennessee producer of silvery has sold an aggregate of 500 tons within the past few days at $53, furnace, for 7 per cent. Counting the difference in freight to Chicago, this iron is $2.90 below what Jackson county makers are asking.

The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, average sil. 1.50 (other grades subject to usual differentials), deliv. at Chicago..	$57.50
Northern coke, No. 1 sil. 2.25 to 2.75.	45.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25.....	43.00
Northern high phos. foundry.....	43.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25.....	50.20
Southern coke, No. 2 foundry, sil. 2.25 to 2.75.....	48.70
Southern foundry, sil. 1.75 to 2.25....	47.00
Malleable, not over 2.25 sil.....	43.50
Basic	42.00
Low phos. (copper free).....	53.00
Silvery, 7 per cent.....	$56.40 to 59.30

Ferroalloys.—Within the past week or two 6400 tons of spiegeleisen has been sold in this territory, the major

part of it at $65, furnace. A shortage in spiegeleisen has developed and current quotations are $75, furnace.

We quote 76 to 80 per cent ferromanganese, last half, delivered, $200; spot, delivered, $235 to $250; 50 per cent ferrosilicon at $85 delivered; spiegeleisen, 18 to 22 per cent, $75 furnace.

Railroad Rolling Stock.—The Baltimore & Ohio has awarded a contract for the construction of 2500 box car bodies and 600 hopper car bodies to the Pullman Co. The New York Central has ordered 500 stock cars from the Haskell & Barker Car Co., and a like number from the Merchants' Despatch Transportation Co. The Chicago & Northwestern is preparing to inquire for 1000 box cars and the Nickel Plate wants 500 hopper cars. The Rock Island has ordered 50 caboose cars from the Standard Steel Car Co., and an inquiry has been received from China for from 300 to 500 freight cars. The Illinois Central will have 3000 gondola cars repaired. The Northern Pacific is in the market for 25 mikado type, 25 Pacific type, six Mallet type engines and 28 wheel switchers.

Plates.—Among finished products, plates continue to be rather sluggish. Some additional railroad business, however, is developing. The Rock Island has bought 50 caboose cars from the Standard Steel Car Co., for which 200 tons of plates and shapes and 50 tons of axles will be furnished by the leading interest. The Illinois Central is in the market for repairs on 3000 gondola cars which will require 12000 tons of plates and shapes. An inquiry for China calls for from 300 to 500 cars. Assuming that the larger number are bought, 3500 tons of plates and shapes will be required. The St. Louis-San Francisco will let car repairs involving 450 tons of plates and shapes.

The mill quotation is 2.65c. to 4c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 4.17c. for plates out of stock.

Structural Material.—A falling off in the demand for structural shapes continues to be a feature of the market. An important corrollary development is the fact that an independent interest has quoted the Corporation price of 2.45c., Pittsburgh, on a western inquiry for from 500 to 1000 tons, promising June delivery. In the fabricating field the tendency to postpone large projects seems to be becoming more general. Recent awards include:

Crocker Estate Co., Belden Building, San Francisco, 550 tons, to California Steel Co.
Pierce County, Wash., viaduct, Burnett, Wash., 307 tons, to Overmire Steel Construction Co.
Great Northern Railroad, bridge work, 290 tons, to Wisconsin Bridge & Iron Co.
Missouri Portland Cement Co., silo bottoms, Prospect Hill, Mo., 208 tons, to American Bridge Co.
Chicago Steel Foundry Co., addition, Chicago, 130 tons, to Rochester Bridge Co.
F. E. Carey Coal Co., trestle, Chicago, 125 tons, to an independent fabricator.

Inquiries include:

Union Pacific Railroad, miscellaneous work, 300 tons.
Great Northern Railroad, bridge, Vancouver, B. C., tonnage not given.

The mill quotation is 2.45c. to 4c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.97c. for materials out of warehouse.

Bars.—A large agricultural implement manufacturer has bought a large tonnage of mild steel bars for last half delivery from an eastern independent at 2.90c., Pittsburgh. Subsequently the same mill has quoted western consumers at the corporation price of 2.35c., Pittsburgh. The conditions prompting this action are not known, but it is felt that some of the independent interests have reached the point where they have little tonnage ahead. This would seem to be indicated by the fact that a western railroad recently secured five days delivery on about 400 tons of shapes for which it paid 3¼c., Pittsburgh. Whatever may be the present bookings of mills in bars or shapes, the demand for bars continues strong. Manufacturers of bar iron find their commitments very heavy, particularly in smaller sizes, which consumers have been buying as a substitute for mild steel. Railroads also are specifying very freely. The 8-in. mill of one local plant has five months work ahead and to discourage the placing of further business in sizes rolled on this mill, prices have been advanced to 4c., while 3.75c. still obtains on other sizes. Other manufacturers find themselves in a similar condition and while they are taking new orders sparingly, they have not yet advanced prices. The demand for rail carbon steel bars is also good, but on account of heavy bookings little new business is being taken except from old customers.

Mill prices are: Mild steel bars, 2.35c. to 4.50c., Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.75c., Chicago; rail carbon, 3.75c., mill. Jobbers quote 3.87c. for steel bars out of warehouse.

Sheets.—Jobbers' stocks of sheets are very low and efforts to replenish them not very successful. Prices have again been advanced ½c. on material ordered out of warehouse.

Mill quotations are 4.35c. to 6.50c. for No. 28 black; 3.55c. to 6c. for No. 10 blue annealed, and 5.75c. to 8.50c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago. The lowest prices are those of March 21.

Jobbers quote, Chicago delivery out of stock No. 10 blue annealed, 7.02c.; No. 28 black, 8c.; No. 28 galvanized, 9.50c.

Wire Products.—The railroad situation has improved little, if at all. At the plants of the leading interest, the shortage of railroad equipment required for shipments exceed 1500 cars. There has been no abatement in the demand for nails, but the tense eagerness of consumers to buy at any price is less in evidence. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1275.

Rails and Track Supplies.—There is considerable inquiry for standard section rails in lots of about 500 tons, but the local mill is unable to take care of it. It is, however, taking on additional tonnage in light rails. On a recent inquiry for tie plates a local manufacturer of iron tie plates quoted 4c. mill.

Standard Bessemer rails, $45 to $55; open hearth rails, $47 to $57. Light rails, 2.45c. to 3.50c. f.o.b. makers' mills. Standard railroad spikes, 3.55c. to 4c. Pittsburgh. Track bolts with square nuts, 4.90c. to 5c., Pittsburgh. Steel tie plates and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 3.75c. f.o.b. makers' mills.

Cast Iron Pipe.—South Bend, Ind., will take bids on 1900 to 2000 tons on April 28. Viroqua, Wis., is in the market for 150 tons of 4, 6 and 8-in. pipe. Aside from these inquiries, the market is practically devoid of activity so far as municipalities are concerned. A moderate amount of private business continues to develop, but on the whole pipe is quiet.

We quote per net ton f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $79.80; 6-in. and above, $76.80; class A and gas pipe, $2 extra.

Old Material.—The scrap market continues inactive and therefore the prices quoted below should be regarded as nominal. As material cannot be moved to any extent, neither consumers nor dealers are buying. The Burlington offers 4500 tons and the Rock Island 2500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$33.00	to $34.00
Relaying rails	45.00	to 55.00
Car wheels	37.00	to 38.00
Steel rails, rerolling	32.00	to 33.00
Steel rails, less than 3 ft.	28.50	to 29.00
Heavy melting steel	23.50	to 24.00
Frogs, switches and guards, cut apart	23.50	to 24.00
Shoveling steel	23.00	to 23.50
Low phos. heavy melting steel	28.00	to 28.50
Drop forge flashings	18.50	to 19.50
	Per Net Ton	
Iron angles and splice bars	$30.50	to $31.50
Steel angle bars	24.00	to 24.50
Iron arch bars and transoms	31.50	to 32.50
Iron car axles	39.00	to 40.00
Steel car axles	32.50	to 33.50
No. 1 busheling	20.00	to 21.00
No. 2 busheling	14.50	to 15.00
Cut forge	24.00	to 24.50
Pipes and flues	17.50	to 18.00
No. 1 railroad wrought	27.00	to 27.50
No. 2 railroad wrought	24.00	to 24.50
Steel knuckles and couplers	23.50	to 24.00
Coil springs	25.00	to 25.50
No. 1 cast	37.00	to 37.50
Boiler punchings	24.00	to 24.50
Locomotive tires, smooth	24.00	to 24.50
Machine shop turnings	12.00	to 12.50
Cast borings	14.00	to 14.50
Stove plate	30.00	to 30.50
Grate bars	29.50	to 30.00
Brake shoes	25.50	to 26.00
Railroad malleable	27.00	to 28.00
Agricultural malleable	26.50	to 27.00
Country mixed	17.50	to 18.50

Bolts and Nuts.—Makers are fast running out of raw material, particularly in Bessemer bolt stock, ⅞-in. and smaller. The demand continues to be far in excess of the available supply. It was incorrectly stated a week ago that jobbers' prices on rivets had

advanced a quarter of a cent. The warehouses merely added an extra for that amount on quantities less than 200 lbs. For mill prices, see finished iron and steel, f.o.b., Pittsburgh, page 1275.

Jobbers quote structural rivets, 5.37c.; boiler rivets, 5.47c.; machine bolts up to ⅞ x 4 in., 30 per cent off; larger sizes, 20 off; carriage bolts up to ⅞ x 6 in., 20 off; larger sizes, 15 off; hot pressed nuts, square tapped and hexagon tapped, 50c. off; coach or lag screws, gimlet points, square heads, 40 per cent off. Quantity extras are unchanged.

Buffalo

BUFFALO, April 27.

Pig Iron.—There were somewhat heavier sales during the past week than any week during the past month. It is believed that somewhat under 15,000 tons of all grades was sold in this district. There were considerable sales of basic iron, the aggregate running up to probably 8000 tons. The greater part of this pig was sold at $45, according to the maker. Another outstanding phase of last week's market was the sale of 1600 tons of malleable iron at $46.25. This is the first large tonnage of malleable sold in this market in some time. The same concern sold 2500 tons of foundry iron at the regular schedule of $45 for 1.75 to 2.25 silicon; $46.25 for 2.25 to 2.75 silicon and $48 for 2.75 to 3.25 silicon. Another company reports the sale of 1000 tons of foundry iron at the same figure, which appears to represent a firm market and there is talk in some quarters of this price rising. There is a shortage of iron throughout the district, and makers point out that the gap caused by the steel strike had never really been filled up and before it could be, the railroad strike descended, creating a still greater need. Furnaces are gradually returning to a normal basis. Lackawanna Steel Co. furnaces which had been banked, have been returned to full blast, it was said at the plant. Donner Steel Co. furnaces which were erroneously reported banked, but were merely on reduced blast, resumed normal schedule within a day after the strike ended in Buffalo. Rogers-Brown furnaces are going back into blast after being blown out. Buffalo Union Furnace and Wickwire furnaces were not obliged to slow blast.

We quote f.o.b. Buffalo:

No. 1 foundry, 2.75 to 3.25 sil.	$48.00
No. 2 X foundry, 2.25 to 2.75 sil.	46.25
No. 2 plain, 1.75 to 2.25 sil.	45.00
Basic	$44.00 to 45.00
Malleable	46.25
Lake Superior charcoal	58.00 to 60.00

Finished Iron and Steel.—Many mills are piling material without making any effort to ship it until the effects of the switchmen's strike has worn off. No new orders are being accepted except those to which concerns are obligated. Many inquiries are backing up on mills, though they are not being considered, generally speaking. The inquiry is ranging between 200 and 400 tons, and is larger than ordinary. Canadian demand seems to have lessened somewhat due to the high cost of building, and fabricators generally are not looking for a very active summer. Consumers here cannot get proper delivery and this is holding up their business. Most plate material is moving at about 4c. per lb. The minimum price of 3c. for rolled bars, asked by conservative independents, has practically disappeared from the market and 3¼c. is now the minimum asking price. The minimum for cold rolled steel by the same producers is now 4¼c. and instances are known where 9½c. has been asked. Mills are now practically again on the operating basis they were prior to the strike.

Jobbers quote the following prices for this territory: Steel bars, 4.61c.; iron bars, 5.26c.; structurals, 4.46c.; plates, 4.66c.; No. 10 blue annealed sheets, 6.51c.; No. 28 black sheets, 8.25c.; No. 28 galvanized sheets, 9.50c.; bands, 5.81c.; hoops, 6.06c.; cold rolled steel, 6.00c.

Old Material.—The market is considerably hampered by the presence of embargoes. Most shipment points in the East are still under embargo as a result of the switchmen's strike and some of the most important shipping points in the West are in similar condition. It is believed that it may be a month before the market recovers from the adverse railroad conditions of the past two weeks. There is a good demand for heavy melting steel, turnings, cast scrap, stove plate, etc. Mills are beginning to feel the lack of shipments during the past week, and at least one mill in the territory is actively in the market for heavy melting steel. Dealers say that there is a prospect of good business ahead as soon as normal conditions can be restored on railroad lines. It is very difficult to get cars and there are coming in now accumulations of cars which will have to be sorted before they can be utilized, thus tying up the situation for a longer period.

We quote dealers' asking prices, per gross ton f.o.b. Buffalo, as follows:

Meavy melting steel, regular grades	$25.00 to $26.00
Low phos., 0.04 and under	32.00 to 35.00
No. 1 railroad wrought	31.00 to 32.00
No. 1 machinery cast	38.00 to 39.00
Iron axles	40.00
Steel axles	41.00 to 42.00
Car wheels	37.00 to 38.00
Railroad malleable	31.00 to 32.00
Machine-shop turnings	16.50 to 17.00
Heavy axle turnings	20.00 to 21.00
Clean cast borings	17.00 to 18.00
Iron rail	30.00 to 31.00
Locomotive grate bars	24.00 to 25.00
Stove plate	32.00 to 33.00
Wrought pipe	21.00 to 22.00
No. 1 busheling	20.00 to 21.00
Bundled sheet stamping	17.00 to 18.00

Birmingham

BIRMINGHAM, ALA., April 27.

Pig Iron.—By the end of last week the Birmingham pig iron market had reached what looked like a fixed minimum of $42 for iron with 1.75 to 2.25 silicon, with some of the smaller interests asking and selling for spot delivery at still higher figures. The reduction of output caused by the outlaw strike lent vigor to the inquiry and stability to the quotations. For the time being at least the leading interest does not figure in the selling, because it has not the iron to deliver when inquiry is made. Evidently its one furnace capacity has been distributed and it cannot care for more foundry unless it puts more stacks in operation. The two largest foundry producers, which have stood for $42 flat, have sold a considerable tonnage throughout the country in scattered lots. One small lot for export to China brought $42. A third interest on the $42 base for some time has advanced to $43 for spot. Chattanooga furnace interests and one Alabama stack have advanced to $44 for spot delivery. No independent maker is selling under $42 and the impression is that the market is headed to $45 at an early date. Certainly not over one-half of the product of the Alabama furnaces for last half remains unsold. Everything points to higher prices. The Woodward Iron Co. has finally been able to blow in one of its stacks at Vanderbilt and now has three on foundry and one on basic. Two Sloss-Sheffield stacks, on which a large amount of money has been expended and which will have an enlarged capacity, will soon figure in production.

We quote per gross ton, f.o.b. Birmingham district furnaces, the Tennessee company excepted, as follows:

Foundry, sil. 1.75 to 2.25	$42.00 to $43.00
Basic	41.00 to 42.00
Charcoal	55.00

Cast Iron Pipe.—Orders for cast iron pipe come in with as much regularity since the recent increase of $4 per ton as before, especially for smaller sizes. Monroe, N. C., has taken 11,000 ft. of 6 in. pipe of the United States Cast Iron Pipe & Foundry Co., and Rock Hill, N. C., has ordered 11,000 ft. Numerous North and South Carolina cities are placing orders. The Bessemer, Birmingham and Anniston plants of the United States company have all they can handle in the flange pipe departments. Work has begun on the new sanitary pipe plant of the Birmingham Pipe & Fittings Co., and operations are expected to ensue by June 1. Other sanitary pipe shops are also being built.

Coal and Coke.—Alabama coal mines have a demand for steam coal greater than they can supply with the limited labor and the poor car service. Many miners have drifted to other work on account of the inability to make full time owing to the car situation. Railroads are paying $3.25 to $3.75, but spot steam coal would bring $5, if available. Coke makers are shipping

some coke to the Southwest and Southeast as well as Pacific Coast, but the vast bulk continues to be absorbed locally. Hand-picked foundry ranges from $11 to $12.

Old Material.—The scrap market is reported to be in an absolute deadlock so far as new business is concerned. Yards are fast disposing of stocks on old contract and taking on new stocks only at bargain prices. Higher prices are expected to follow the rising iron market.

We quote per gross ton, f.o.b. Birmingham district yards prices to consumers, as follows:

Steel rails	$21.00 to $21.50
No. 1 heavy steel	20.00 to 20.50
Cast-iron borings	11.00 to 11.50
Machine-shop turnings	11.00 to 11.50
Stove plate	24.00 to 24.50
No. 1 cast	31.00 to 32.00
Car wheels	30.00 to 31.00
Tramcar wheels	28.00 to 29.00
Steel axles	29.00 to 30.00
No. 1 wrought	21.00 to 21.50

Cincinnati

CINCINNATI, April 27.

Pig Iron.—The market is quiet and sales during the week in this territory have aggregated not more than 3000 tons. One of the smallest weeks for many months. The Tennessee company disposed of a small tonnage of Southern iron among its regular customers at $38, Birmingham, for the base grade, but it is now understood that it has withdrawn from the market. A sale of 250 tons of Southern iron, silicon 2.25 to 2.75, is noted in this territory at $43.25, Birmingham. This is the largest sale of Southern iron made in this territory during the week. A fair tonnage of Southern iron was disposed of by local sellers in the St. Louis district last week. To-day a sale of 750 tons of Northern foundry, silicon 2.25 to 2.75, to an Indiana melter was made at $45.25, southern Ohio furnace. The iron was for delivery during the second and third quarter. At least one southern Ohio furnace is now quoting $45 for first half, and $44 for second, with the others holding firmly to $45 for rest of the year. Virginia furnaces are reported to be on a $44 base, and Jackson county silvery is quoted at $55 to $58 for 8 per cent. No interest is being shown in basic, though it is reported that a southern Ohio interest which recently inquired for 10,000 tons, has 5,000 yet to contract for. A sale of 1100 tons of malleable for Chicago delivery is reported at prices ranging from $46.25 to $53.25, depending on silicon content. The only inquiry of note before the market is one from a near-by melter for 1000 tons each of northern and southern foundry iron. Lawrence furnace of the Marting Iron & Steel Co. is banked on account of fuel shortage, and several others in southern Ohio are running on the ragged edge.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$45.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	46.85
Ohio silvery, 8 per cent sil.	56.80
Southern Ohio coke, sil. 1.75 to 2.25 (No 2)	46.80
Basic Northern	41.80
Malleable	$45.80 to 46.80

Coke.—The coke situation is getting serious. Reports from all fields indicate that very little coke is moving. Some Wise County operators have made contracts for coke, beginning July 1, at $13, several Connellsville operators are still renewing old contracts at $10, but quotations for foundry coke for prompt shipment from all fields indicate that $12 to $13 is the prevailing price. As high as $17 has been offered for spot coke by local foundries, but none is available even at that price.

Finished Material.—There is still a heavy demand for finished steel, such as bars, plates, bands, cold rolled and all wire products. Structural shapes are quiet. Sheets are also in good demand, though there is not the feverish scramble to secure them regardless of price as was evident some time ago. Most of the consumers in this district are reported as fairly well covered on sheet requirements for the second and third quarter and brokers holding sheets for premium prices are not meeting with much encouragement from buyers. All deliveries are being held up on account of the railroad situation, and warehouses report stocks as dwindling fast. Prices remain unchanged from last week.

Jobbers quote: Iron and steel bars, 5c. to 6c.; structural shapes, 5.10c.; plates, 5c.; steel bands, 6.25c. base; No. 10 blue annealed, 7c.; No. 28 black sheets, 7.75c. to 8.75c.; No. 28 galvanized sheets, 9c. to 10c.

Old Material.—The scrap market is stagnant. No cars are available to move it and as a consequence trading is practically at a standstill. A number of small sales of cast scrap to foundries are reported, deliveries being made by truck. It is expected that several railroads will offer considerable tonnages of scrap when the market takes a more favorable turn. Prices quoted below are nominal, and represent those in effect when trading was stopped by the strike of railroad men.

We quote as follows:

Per Gross Ton	
Bundled sheets	$16.00 to $17.00
Old iron rails	27.00 to 28.00
Relaying rails, 50 lb. and up	50.00 to 51.00
Rerolling steel rails	30.00 to 31.00
Heavy melting steel	21.50 to 22.50
Steel rails for melting	24.00 to 25.00
Car wheels	29.00 to 30.00
Per Net Ton	
No. 1 railroad wrought	$26.00 to $27.00
Cast borings	13.50 to 14.00
Steel turnings	11.50 to 12.00
Railroad cast	31.00 to 32.00
No. 1 machinery	35.00 to 36.00
Burnt scrap	22.00 to 23.00
Iron axles	29.50 to 30.00
Locomotive tires (smooth inside)	23.50 to 24.50
Pipes and flues	17.00 to 17.50
Malleable cast	23.00 to 23.50
Railroad tank and sheet	16.00 to 16.50

New York

NEW YORK, April 27.

Pig Iron.—The pig iron market continues strong, with a very comfortable demand from both domestic and foreign sources. Among the sales are a considerable number of a few hundred tons each and one for 2500 tons of foundry iron for immediate delivery. Among the inquiries is one for 3000 tons from a Connecticut melter and one for from 8000 to 10,000 tons of foundry iron of various analyses for last half delivery. The price tendency is still upward and $46 is now the minimum at furnace, eastern Pennsylvania, for the base iron. One eastern Pennsylvania furnace which has sold at $45 will not now sell for less than $47 furnace for No. 2 plain. Two Susquehanna and one Oxford stack have been added to the active list. One firm reports that it could have sold some 10,000 tons of foundry iron for export last week if it could have obtained the iron. Price was not the deciding factor, but furnaces were not willing to part with their iron, as they are not certain that they will have enough for their domestic customers. Foundries are having a great deal of trouble and are unable to obtain supplies of coke and iron and many are in danger of being compelled to close at any time.

We quote for delivery in New York as follows:

East. Pa., sil. 2.75 to 3.25	$50.05 to $51.05
East. Pa., sil. 2.25 to 2.75	49.05 to 50.05
East. Pa., No. 2 plain, sil. 1.75 to 2.25	47.80 to 48.80
Buffalo, sil. 1.75 to 2.25	47.90 to 48.90
No. 2 X Virginia, sil. 2.25 to 2.75	47.65

Ferroalloys.—The ferromanganese market is quiet but very strong. There have been no changes in quotations and domestic alloy for last half is obtainable at $200, delivered, with some British alloy quoted at $195, seaboard, for shipment from August on. There is almost no inquiry for forward delivery, but for delivery prior to July 1 there is some activity and it is possible to sell anything that is offered for this position. There have been a few sales of British alloy at $225, seaboard, for delivery before July 1 and at least $250 could be realized for prompt delivery. The railroad situation has seriously interfered with the shipment of alloy sold on contract, whether British or American, some of the former being tied up

either on wharves or otherwise because of inability to find cars to ship it to consumers. The spiegeleisen market has been inactive but very strong at $75, furnace, for the 18 to 22 per cent alloy. A sale of 500 tons has been made at that price. Quotations for manganese ore range from 65c. to 80c. per unit, seaboard, depending upon the delivery, but no transactions are heard of. Most producers of 50 per cent ferrosilicon are sold up to July 1 and quotations are largely nominal at $85 to $90 per ton, delivered.

Finished Iron and Steel.—A gradual betterment in the movement of freight, though perhaps not so good as was to be expected from daily press reports, indicates that nevertheless shipping is rapidly bettering. Few items of special importance calculated to throw light on the future developments of the markets were obtained. Sales and inquiries on export account stand conspicuous and practically nothing is evident of any weakness. The purchase of several hundred tons of plates at 3.50c., Pittsburgh, is claimed, but against this is a heavy array of export sales at 4c., as noted elsewhere in this issue, and a specially attractive lot for 3/16-in. plates at 3.75c. A claim is made of a low price on a tentative lot of 25,000 tons for a domestic shipyard, carrying an option of 10,000 tons additional, but another yard has received a quotation of 4c., Pittsburgh, on 4000 tons. Some cancellations of Japanese purchases are noted and a round tonnage of bars in New York, intended for the Far East, has been offered, but 4c. is asked. The largest new project in fabricated steel involves 10,000 tons for a power house for the United Electric Light, Heat & Power Co., at Hell Gate, New York, while the only suspended work is that for a highway bridge at Messena, N. Y., which took bids so long after an appropriation was made that the money available was insufficient. The American Bridge Co. has been awarded 900 tons for the Armstrong Cork Co., Lancaster, Pa.; 200 tons for the Boston & Maine, which has also closed on some miscellaneous bridge work with other fabricators totaling 185 tons; 300 tons for Pier 16, North River, for the Snare & Triest Co., and 300 tons for the Baltimore & Ohio at Guysville, Ohio. The Bethlehem Steel Bridge Corporation will supply 900 tons for the 108th Street inspection shed for the Transit Construction Co. Shapes are easier to get than a few weeks ago.

We now quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 4.77c.; shapes, 2.72c. to 4.27c.; plates, 2.92c. to 4.27c., the minimum prices being for indefinite delivery and the higher prices for the second quarter; bar iron, flats, wider than 6 in., 4.57c.; ⅜ and 7/16 in., round and square, 5.27c.; light rounds, squares and flats, 5.77c., and other sizes, 4.27c.

High Speed Steel.—Prices remain the same at $1.25 to $1.30 per lb., New York, with imported steel selling at slightly lower figures. Some producers predict a strong rise in prices if the tungsten bill is passed by Congress.

Warehouse Business.—Although a few carloads are being received since the break in the railroad situation, warehouse business remains about the same as during the past few weeks. Open-hearth spring steel is selling in most cases at 7c. per lb. for large sizes, but the smaller sizes are bringing up to 10c. and higher. Prices on black and galvanized wrought iron pipe have been increased from 2 to 3 per cent to conform with Boston quotations. While the mills have entered into negotiations with the strikers, the situation in brass and copper is unchanged, practically all mills being shut down by the strike. Prices are the same but with light stocks in warehouses an advance is expected.

Cast-Iron Pipe.—The recent raise in prices does not seem to have curbed orders. Manufacturers are adhering to the new prices strictly, and there appears to be no lessening of demand. We quote 6-in. and heavier at $76.30, New York; 4-in., $79.30, with $2 additional for Class A and gas pipe.

Old Material.—Though shipping conditions are better, the market is as quiet as it has been the past few weeks. Prices remain fairly firm, though there is a decline of about 50c. in several items from a week ago. There is a slight flurry of demand for malleable cast which has forced up prices a trifle. The chief buying is among dealers.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$19.50 to $20.50
Rerolling rails	30.00 to 31.00
Relaying rails, nominal	52.00 to 54.00
Steel car axles	36.00 to 37.00
Iron car axles	43.50 to 44.00
No. 1 railroad wrought	32.00 to 33.00
Wrought iron track	22.00 to 22.50
Forge fire	16.00 to 16.50
No. 1 yard wrought, long	25.00 to 25.50
Light iron	9.00 to 10.00
Cast borings (clean)	17.50 to 18.00
Machine-shop turnings	16.00 to 16.50
Mixed borings and turnings	15.00 to 15.50
Iron and steel pipe (1 in min. diam., not under 2 ft. long)	21.50 to 22.00
Stove plate	28.00 to 28.50
Locomotive grate bars	27.00 to 27.50
Malleable cast (railroad)	29.00 to 30.00
Old car wheels	38.00 to 38.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$39.00 to $40.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	38.00 to 39.00
No. 1 heavy cast, not cupola size	32.00 to 33.00
No. 2 cast (radiator, cast boilers, etc.)	32.00 to 33.00

Boston

BOSTON, April 27.

Pig Iron.—Business during the past week, due to the railroad transportation situation, has been confined to spot and nearby iron, and because of supply limitations actual sales have been few and far between, the total not exceeding 2,000 tons. Spot iron held at a Boston & Albany railroad point has sold in car lots at $60 f.o.b. yard, which brings the delivered price up to between $63 and $64, while a Worcester concern has re-sold iron on a delivered basis of better than $65, but these cases are exceptions. The largest individual sale reported is 300 tons No. 2 plain resale iron for July 1 delivery, and there have been numerous smaller lots of silicon 2.25 to 2.75, similar delivery, on a furnace base of $44.50. What other business has been put through was at prices quoted last week. Delivered prices follow:

East. Penn., sil. 2.25 to 2.75	$48.15 to $50.15
East. Penn., sil. 1.75 to 2.25	46.90 to 48.90
Buffalo, sil. 2.25 to 2.75	47.15 to 50.15
Buffalo, sil. 1.75 to 2.25	45.90 to 48.90
Virginia, sil. 2.25 to 2.75	47.95 to 49.95
Virginia, sil. 1.75 to 2.25	46.70 to 48.70
*Alabama, sil. 2.25 to 2.75	49.95
*Alabama, sil. 1.75 to 2.25	47.75

*Alongside Boston prices.

Old Material.—Decidedly weak spots have appeared in the old material market in the past few days, especially as regards borings and turnings, for which there is limited call and freer offerings. Contrasted with the general tendency of values is the pronounced strength of street car axles due to an export demand. Axles for which there was little call a week ago at $31 to $32, have been bought this week at $35 and $36 in this market. Yard wrought is relatively firmer than railroad wrought because of purchases by horseshoe manufacturers on a $28 delivered basis. Eastern Pennsylvania interests continue to take heavy melting steel on a $24 delivered base. The largest New England consumer of turnings is insisting on existing contracts being filled before it will place new orders, which in a measure explains the weakness of borings and turnings values. Stove plate consumers apparently have supplied their immediate wants. Foundries have bought No. 1 machinery in a limited way at $43 and $44 delivered, and No. 2 at $41. The Boston & Maine Railroad has sold 50 cars miscellaneous railroad scrap this week and the General Electric Co., Lynn, Mass., 25 cars. Local yard prices, which are erratic, follow:

No. 1 heavy melting steel	$19.50 to $20.50
No. 1 railroad wrought	28.00 to 29.00
No. 1 yard wrought	24.50 to 25.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	20.50 to 21.50
Machine shop turnings	15.00 to 15.50
Cast iron borings	15.50 to 16.00
Heavy axle turnings	16.00 to 17.00
Blast furnace borings and turnings	14.50 to 15.00
Forged scrap	15.50 to 16.00
Bundled skeleton	15.50 to 16.00
Street car axles	35.00 to 36.00
Car wheels	37.00 to 38.00
Machinery cast	39.00 to 40.00
No. 2 cast	36.00 to 37.00
Stove plate	29.00 to 30.00
Railroad malleable	26.50 to 27.50
Rerolling rails	28.00 to 29.00

Cleveland

CLEVELAND, April 27.

Conditions resulting from the switchmen's strike do not show the expected improvement, and in fact are about as bad as they could be. Practically no steel is being shipped into Cleveland from Pittsburgh and the other territories, but some mills in other districts are able to make shipments to some Ohio points. As a rule, railroads are accepting shipments only for points on their own lines. Some carload shipments are coming from Chicago warehouses. The Champion Rivet Co., one of the largest consumers, and some other manufacturers in this territory have shut down their plants for lack of steel. Shipments from Cleveland are almost cut off, although the McKinney Steel Co. has been able to ship some full train loads of semi-finished steel and pig iron. The Otis Steel Co. has resumed operation of its plate mills, but can make no shipments and doubts whether it will be able to keep these mills running. Local warehouses are able to ship a small amount of steel by rail. Some local foundries have shut down and others have curtailed production because of the lack of coke, and some are hauling pig iron by truck from blast furnaces. Efforts to effect a settlement of the strike of the dock laborers at the head of the Lakes failed Monday. Another conference is being held to-day, but the prospects for an early agreement are not promising.

Iron Ore.—The first ore cargo of the season was shipped from the Allouez dock at Superior April 24 and is due to arrive in Cleveland on Wednesday. With the exception of this dock, the opening of the season of navigation has been prevented by the refusal of the dock employees at the other docks at the head of the Lakes to start work for the season, unless they are granted a 40 per cent increase in wages. The handling of ore at the Allouez dock has been placed by the railroad in the hands of a contractor, so that the dock laborers are not employees of the railroad, and the strike has not spread to this dock. The dock employees, in addition to the wage increase, have demanded a triple shift instead of a double shift with overtime. The wages demanded are 75c. per hour for the first 8-hour shift, 77½c. for the second and 80c. for the third. Railroads are sending cars to the mines to take care of ore that is brought up in the hoist, providing the stock piles are already filled, but with this exception no cars are being loaded. The labor trouble is delaying the starting of operations in the open pit mines. Dock shipments from Lake Erie ports are very light because of the railroad situation.

We quote, delivered, lower Lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Pig Iron.—A fair demand for small lots of foundry iron for early shipment has developed and several inquiries have come out for lots of 300 to 400 tons for the second quarter delivery. This is probably due to the fact that some consumers find that they will need more iron than they have purchased and because others are unable to get shipments from their regular sources of supply. While the railroad situation has improved so that some of the producers are able to ship out all their iron, others as yet are not able to make any shipments. No pig iron is being received in Cleveland and not much is being shipped from this city by local furnaces, although one producer has been able to make shipments to certain points by making up an entire train-load of pig iron and steel. Shipments to Detroit and many other Michigan points are embargoed. A Cleveland interest has advanced prices on foundry iron to $44 for No. 2 for shipment from its Valley furnace and has sold a 1000-ton lot at that price for delivery during the remainder of the year. Other northern Ohio makers are still quoting the same prices for foundry iron for the last half, but some are asking a $1 a ton advance for prompt shipment iron, and southern Ohio foundry iron for prompt shipment is being quoted at $44.50 to $46. Southern iron is firm at $42 for 1.75 to 2.25 silicon. We note the sale of a 1000-ton lot for the last half at $45.40 for 2.75 to 2.35 silicon. The $55 price on Ohio silvery iron has apparently disappeared. One or two sellers that have been quoting on that basis have advanced their price to $58. A Detroit consumer is inquiring for 2000 tons of silvery for the last half.

We quote, delivered Cleveland, as follows, based on 40c. switching charge for local iron, a $1.40 freight rate from Valley points and $5 from Birmingham:

Basic	$43.40
Northern No. 2 foundry, sil. 1.75 to 2.25	43.40
Southern foundry, sil. 2.25 to 2.75	$48.70 to 49.70
Gray forge	41.40
Ohio silvery, sil. 8 per cent	61.40
Standard low phos., Valley furnace	48.00 to 50.00

Finished Iron and Steel.—New demand for finished steel is rather light. Some of the implement manufacturers and other consumers are pressing the mills for third quarter contracts, and one independent mill has taken some steel bar business for that delivery at 3.50c. to 3.75c., but with this exception mills have not opened their books for that delivery. Because of delays in production, mills will carry over to third quarter a great deal of tonnage on second quarter contracts. For steel bars, plates and structural material 4c. is the generally quoted price, but one mill has recently made sales in a limited volume at 3c. for steel bars and 3.10c. for structural material and 3.50c. for plates for rather early deliveries. Eastern mills able to make early shipments have no trouble in selling structural material in car lots of 4c. to 4.25c. With a few exceptions, consumers in this territory are not suffering from the scarcity of steel because of the strike as they are using up their stocks. Little new activity has developed in the building field. The General Drop Forge Co., Buffalo, has placed 200 tons with the Kellogg Structural Steel Co., for a plant extension. The Seneca Wire & Mfg. Co., Fostoria, Ohio, has placed 200 tons for plant extension. An inquiry is out for 175 tons for a Keith theater in Cleveland. The demand for hard steel bars continues fairly active and the price is firm at 4c. No change has developed in the sheet situation. Some of the mills that are operating are able to make no shipments. An acute shortage continues, particularly in automobile sheets, and high premiums are still being paid.

Cleveland warehouses quote steel bars at 3.27c. to 5c.; plates, 3.57c. to 5c., and structural material, 3.70c. to 5.10c.

Old Material.—A Cleveland steel plant has purchased 10,000 tons of mixed borings and turnings at $17.50 and 1500 tons of heavy melting steel at $24.50. This was about the only activity in the market during the week aside from the small lot sales between dealers. The railroads are now accepting scrap for shipment to consumers on their own lines but as little material reaches its destination over one line, shipments have been very light since the strike was broken. Sales between dealers are reported at $24 for heavy melting steel and $17 for mixed borings and turnings and blast furnace turnings. Compressed steel scrap is a drug on the market and weak. Dealers are offering from $41 to $42 for No. 1 cast, or about $1 a ton lower than recent prevailing prices.

Dealers quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$23.50 to $24.00
Steel rails under 3 ft	25.00 to 27.75
Steel rails, rerolling	31.00 to 32.00
Iron rails	32.00 to 33.00
Iron car axles	41.00 to 42.00
Steel car axles	36.00 to 37.00
Low phos. melting scrap	26.25 to 26.50
Cast borings	17.00 to 17.25
Iron and steel turnings and drillings	13.50 to 14.00
Short turnings for blast furnaces	17.00 to 17.25
Compressed steel	19.50 to 20.00
Railroad wrought	28.00 to 29.00
Railroad malleable	31.00 to 32.00
Steel axle turnings	19.50 to 20.00
Light bundle sheet scrap	15.00 to 15.50
Drop forge flashings over 10-in.	17.00 to 17.50
No. 1 cast	41.00 to 42.00
No. 1 busheling	18.50 to 18.75
Railroad grate bars	25.75 to 26.00
Stove plate	29.00 to 30.00

Coke.—No shipments of Connellsville coke are being received in this territory and some foundries have been forced to shut down and others to curtail operations. The market is fairly active and sales of Connellsville coke are reported at $11 to $12 for the last half and $12.50 for shipment as soon as possible. The inability to secure Connellsville coke has stimulated a demand for Virginia foundry coke and considerable of that coke was sold in this territory during the past

few days, most of it at $12 for the last half or full year. Later the price was advanced to $13 and after making sales at the advance the producer withdrew from the market for last half coke.

St. Louis

St. Louis, April 26.

Pig Iron.—Although there have been a considerable number of sales in the pig iron market for forward delivery, there has been no special feature of note. Aside from one sale of 2,000 tons of Southern iron for last half, the transactions were all below 1,000 tons, and the aggregate probably 7,000 to 8,000 tons. On current shipments, there continues to be much interference with delivery and very little is coming forward on account of the embargo with the result that more and more plants are expected to be obliged to close unless there is early relief. It is also true that many shipments started for St. Louis are being diverted en route because of the developments following the loading of the cars preventing them from getting through. The aggregate of the Tennessee company's sales at $38 per ton in this territory was about 6,500 tons and it went to the oldest of the company's customers. Many regulars of late association with the company could not be taken care of on the allotment made by the company at the figure given. Other sales by other furnaces in this market have ranged from $40 to $42 per ton, with one or two furnaces asking $44 for No. 2 Southern Birmingham basis. The Tennessee company is now out of this market. Most of its sales were on foundry iron. No. 2 Northern is quoted at $45, Ironton. Lake Superior has sold up to $59 per ton for charcoal iron.

Finished Iron and Steel.—Very little is being done in finished products and the shipments coming through are at a minimum, although the warehousemen report that there has been some improvement in the locating of cars in distant sections of the yards and these are being unloaded and hauled to the warehouses for delivery to customers.

For stock out of warehouse we quote as follows: Soft steel bars, 3.94c.; iron bars, 4.59c.; structural material, 4.04c.; tank plates, 4.24c.; No. 10 blue annealed sheets, 7.09c.; No. 28 black sheets, cold rolled, one pass, 8.10c.; No. 28 galvanized sheets, black sheet gage, 9.60c.

Old Material.—Conditions remain unchanged, with the market very dull.

We quote dealers' prices, f.o.b. customers works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	$32.50 to $33.00
Old steel rails, rerolling	31.50 to 32.00
Old steel rails, less than 3 ft	26.00 to 26.50
Relaying rails, standard sections, subject to inspection	50.00 to 55.00
Old car wheels	34.50 to 35.00
No. 1 railroad heavy melting steel	22.50 to 23.00
Heavy shoveling steel	21.50 to 22.00
Ordinary shoveling steel	21.00 to 21.50
Frogs, switches and guards, cut apart	24.00 to 24.50
Ordinary bundled sheets	14.50 to 15.00
Per Net Ton	
Heavy axle and tire turnings	16.00 to 16.50
Iron angle bars	29.50 to 30.00
Steel angle bars	22.00 to 22.50
Iron car axles	39.50 to 40.00
Steel car axles	33.50 to 34.00
Wrought arch bars and transoms	31.00 to 31.50
No. 1 railroad wrought	25.50 to 26.00
No. 2 railroad wrought	23.50 to 24.00
Railroad springs	22.50 to 23.00
Steel couplers and knuckles	24.00 to 24.50
Locomotive tires, 42 in. and over, smooth inside	22.50 to 23.00
No. 1 dealers' forge	22.00 to 22.50
Cast iron borings	14.00 to 14.50
No. 1 busheling	21.50 to 22.00
No. 1 boiler, cut to sheets and rings	17.00 to 17.50
No. 1 railroad cast	35.00 to 35.50
Stove plate and light cast	30.50 to 31.00
Railroad malleable	26.00 to 26.50
Agricultural malleable	25.50 to 26.00
Pipes and flues	17.00 to 17.50
Heavy railroad sheet and tank	16.50 to 17.00
Railroad grate bars	27.50 to 28.00
Machine-shop turnings	13.50 to 14.00
Country mixed	19.00 to 19.50
Uncut railroad mixed	19.50 to 20.00
Horseshoes	24.50 to 25.00

Coke.—The coke market has been active the past week with many contracts made for last half delivery, but none beyond that period got through in this locality. The sales were at $12 per ton Connellsville, and $13 per ton for New River coke, but the latter is now out of the market. The producers are limiting coke to customers to no more than their taking in the first half and in some cases the limit is being put at two-thirds of the first half allotment. No new customers are being taken on. The by-product coke producers are out of the market and some are reported as in danger of shut down because of the coal situation due to the railroad strike.

Philadelphia

PHILADELPHIA, April 27.

Demoralization of industry, due to the railroad strike and the embargoes on freight shipments, is more widespread and serious than is, perhaps, generally realized. Detroit apparently is the hardest hit of any industrial center, but innumerable manufacturing plants in all lines throughout the country are affected by shortage of coal or raw materials, many being wholly or partially shut down. Inability to ship out finished products has resulted in congestion at plants to the extent that further manufacturing operations, in some departments, at least, have had to be suspended.

Railroad embargoes have been only partially lifted. The Pennsylvania Railroad will accept shipments only over its own lines, and some western points on this road are still under embargo. Steel mills have been obliged to revise their rolling schedules to meet the new conditions, and are putting through rollings that can be shipped. Some consumers have accepted shipments of three or four times their normal quota for this month, which means that other consumers, to whose plants shipments cannot be made, will be out of alignment on deliveries when conditions again permit transportation to all points.

The Bethlehem, Midvale and Cambria plants have been operating at a fairly good rate in the past week, considering the difficulties. The Eastern Steel Co. has been unable to resume operation of its open-hearth and finishing departments, but got a furnace in blast on Sunday. The furnace was banked about a week on account of lack of coke. The Alan Wood Iron & Steel Co. has resumed at two of its blast furnaces, which were banked. The Lukens plant operated at less than 50 per cent last week and other steel plants in the East have had more or less difficulty in operating.

The shortage of steel at the Cambria works has caused a cessation of rolling of rails and shapes, the steel being diverted into other products.

Although Detroit is under embargo, an automobile manufacturer there succeeded in making an arrangement with the railroads for the shipment of 38 cars of steel, which were shipped a few days ago in one train from an eastern plant.

The pig iron and scrap markets are extremely quiet. A new factor in the pig iron situation is the sale of southern iron by the Tennessee Coal, Iron & Railroad Co. on the basis of $38, Birmingham. A sale of 2000 tons to a Baltimore foundry is reported to have been made at a delivered price less than the quotations being made by eastern makers at their furnaces. Reports of shading of prices by eastern furnaces have been circulated for the past two or three weeks, but are denied by sellers.

The Baltimore & Ohio Railroad has bought 10,000 tons of plates, shapes and bars. The Southern Pacific is inquiring for 5600 tons of shapes and 2700 tons of universal plates, and there is an inquiry here for 16,000 tons of plates for a water line at Seattle, Wash.

Pig Iron.—A new factor in the pig iron situation is the sale of southern iron for northern shipment at prices less than the northern furnaces are quoting. The Tennessee Coal, Iron & Railroad Co. has offered foundry iron on the basis of $38, Birmingham, for 1.75 to 2.25 per cent silicon grade. A sale of 2000 tons of iron analyzing 2.25 to 2.75 per cent silicon is reported to have been made to a Baltimore foundry at $39, Birmingham, making the delivered price less than eastern makers are quoting f.o.b. furnace for a like grade of iron. Persistent reports of shading of

prices on eastern foundry iron have been circulated for the past two or three weeks, but these are denied by sellers, who state that if such concessions have been made, it was on off-grade iron. One report was that a leading seller had made sales at $43, furnace, for No. 2 plain iron. Buffalo iron, also, it is reported, has come into this territory at prices less than eastern furnaces were willing to quote. Several of the leading eastern makers have advanced foundry iron $1 a ton, to the basis of $46, furnace, and Virginia makers are now practically a unit in asking $44 base, furnace. A western Pennsylvania furnace has also advanced to $44. The past week has been extremely quiet in the pig iron market, consumers being chiefly interested in getting deliveries of iron already under contract. The situation as to production is better than a week ago, several furnaces which were banked now being in operation again. A sale of 1000 tons of standard low phosphorus iron has been made at $50, furnace, but other steel-making grades are inactive.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

East. Pa., No. 2 X, 2.25 to 2.75 sil.	$47.05 to $47.35
East. Pa., No. 2 plain, 1.75 to 2.25 sil.	45.80 to 46.10
Virginia No. 2 plain, 1.75 to 2.25 sil.	47.35 to 48.10
Virginia No. 2 X, 2.25 to 2.75 sil.	49.35
Basic deliv. eastern Pa.	44.80
Gray forge	43.00 to 44.00
Standard low phos. (f.o.b. furnace)	50.00
Malleable	46.75
Copper bearing low phos. (f.o.b. furnace)	47.00

Ferroalloys.—The railroad situation has caused an acute shortage of ferromanganese, which has led to reports that ferromanganese is actually in such short supply that many consumers would not be able to get all that they require over the remainder of the year. Leading makers say, however, that while there is no surplus of ferromanganese there will be enough to go around. The present shortage will be alleviated as soon as the railroads can handle shipments. Ore receipts have been larger in the past month, and the Lavino Furnace Co. will soon have all four of its furnaces on ferromanganese production. The price for last half continues at $200, delivered, while $250 was the last price reported on spot sales. Spiegeleisen is held by one maker at $75, furnace, but this is above the actual market.

Coke.—Blast furnaces in need of spot coke have been obliged to pay $11, Connellsville. No contracts are reported on this basis, however, most of the sellers stating that they have no contract coke, though spot coke appears to be in fair supply, the difficulty being in getting it shipped. A New England coke manufacturer has sold foundry coke at $13, shipping point, a New Jersey consumer paying $16.60, delivered, for a carload shipment.

Semi-Finished Steel.—Sales of open-hearth rerolling billets have been made in the past week at $60, $65 and $70, Pittsburgh, while forging billets command $70 to $80 a ton. Wire rods have been sold at $80, Pittsburgh. A recent sale of forging slabs was at $85, Pittsburgh.

Plates.—Output of plates at some eastern mills has been very much restricted in the past week, owing to the effects of railroad troubles. The shortage of coal is an important element in the situation. One plate mill has been operating at a fair rate, but was obliged to alter its rolling schedules to meet the new conditions caused by railroad embargoes. It can ship to some consumers, but not to others. In this emergency it has obtained the acceptance by consumers of overshipments. In a few instances consumers have taken three or four times their specified quota for this month. The Baltimore & Ohio Railroad last week placed orders for about 10,000 tons of plates, shapes and bars, all or most of the business going to a Pittsburgh independent. There were bids from 12 steel companies, the bids on plates ranging from 2.65c. to 4c., Pittsburgh. The business is reported to have been placed at 3.25c. or 3.50c. for plates, 3.25c. for shapes and about the same price for bars. The Pennsylvania Railroad recently inquired for 8000 to 10,000 tons of plates, shapes and bars, but mills were unwilling to quote unless specific information was given as to sizes and the tonnages of each required; therefore the general inquiry was withdrawn and a more specific inquiry will be issued. Another railroad inquiry comes from the Southern Pacific for 5600 tons of shapes and 2700 tons of universal plates, presumably for bridge work. The largest plate inquiry is for 16,000 tons of ⅝ and 9/16-in. plates for a water line from Swan Lake to Seattle, Wash. Eastern mills continue to quote plates at 3.75c. to 4.25c., Pittsburgh, but some Pittsburgh mills are quoting at lower prices.

Structural Material.—The demand for steel for building purposes has fallen off considerably in the past few weeks, several projects, which were under consideration, having been abandoned owing to high costs and the labor situation. This applies to a hotel for Atlantic City, which would have taken 2000 to 3000 tons of steel. At one plant production of shapes has been curtailed to give more steel to other departments. One of the eastern shape mills has been shut down for more than two weeks, due to the shortage of coal. Prices quoted by eastern mills are 3.75c. to 4c., Pittsburgh, but a Pittsburgh mill is reported to be offering shapes at about 3.25c.

Bars.—The first sale of soft steel bars for third quarter by one large eastern maker was made a few days ago to a New England consumer at 4.25c., Pittsburgh, or $5 a ton above the price for second quarter. Another mill has taken small orders at 4.75c., Pittsburgh. The demand for bars continues very heavy.

Sheets and Tinplate.—An eastern steel company, which will produce sheets beginning about the middle of the year, is quoting 6.50c., Pittsburgh, on No. 10 blue annealed and 7c., Pittsburgh, on one-pass cold rolled. The same company is selling tinplate at $8.50 and $8.75 per base box, Pittsburgh.

Old Material.—The market is stagnant. Prices are unchanged. We quote as follows for delivery to consuming points in this territory:

No. 1 heavy melting steel	$24.00 to $24.50
Steel rails rerolling	32.00 to 33.00
No. 1 low phos., heavy 0.04 and under	30.00 to 31.00
Car wheels	40.00 to 41.00
No. 1 railroad wrought	29.00 to 30.00
No. 1 yard wrought	29.00 to 30.00
No. 1 forge fire	19.50 to 20.00
Bundled skeleton	19.50 to 20.00
No. 1 busheling	24.00 to 25.00
No. 2 busheling	18.50 to 19.50
Turnings (short shoveling grade for blast furnace use)	18.00 to 19.00
Mixed borings and turnings (for blast furnace use)	17.50 to 18.00
Machine-shop turnings (for rolling mill and steel works use)	19.00 to 19.50
Heavy axle turnings (or equivalent)	20.00 to 21.00
Cast borings (for rolling mills)	20.00 to 21.00
Cast borings (for chemical plant)	24.00 to 25.00
No. 1 cast	38.00 to 40.00
Railroad grate bars	30.00 to 31.00
Stove plate	29.00 to 30.00
Railroad malleable	30.00 to 31.00
Wrought iron and soft steel pipes and tubes (new specifications)	24.50 to 25.00
Iron car axles	45.00 to 46.00
Steel car axles	42.00 to 44.00

Valuable Reference Book

The Brier Hill Reference Book is the title of a valuable compendium in book form which is being distributed to the trade by the Brier Hill Steel Co. at Youngstown, Ohio. It contains valuable copyrighted tables and data which the purchaser of blooms, billets, slabs, bars, plates, sheets or roofing finds it necessary to consult. A pictorial story of the making of steel from ore to the finished product, with views of the company's properties, is included. "We have endeavored to make this edition a textbook rather than a catalog," states the foreword. Inquiries for the book have been received not only from the trade, but from libraries, schools, colleges and universities. It contains a complete history of the company and a description of its mines and plant. The company has made preparations to distribute 15,000 copies. The book was compiled and edited by Russell G. Carter, advertising manager, and is the result of several years' research work. Its tables enable the user to readily calculate the weights of sheet bar, steel plates, blue annealed and black sheets and galvanized sheets. It also contains bundling tables for black galvanized sheets.

British Market Strong

Japanese Cancellation a Factor—China Buying—Tin Plates Easier—American Rail Sales

(By Cable)

LONDON, ENGLAND, April 27.

Conditions in the pig iron market are unchanged. The hematite iron position is a little easier but prices are firm. More iron ore is arriving and an increased output of pig iron is anticipated if the fuel difficulty is overcome. Foreign ore freights are weaker with Bilbao ore sold at Middlesbrough at 32s. 6d.

The steel market is strong with the price tendency still upward, as high as £35, basis, having been paid for round bars for the home trade. China is a large buyer of heavy and thin plates, but Japan is cancelling contracts here for finished material owing to the financial crisis. The tin plate market is easier, with prompt delivery sold at 74s. to 75s., June delivery at 73s. to 74s., and July-September at 72s. to 72s. 6d. all basis f.o.t. American tin plates are being offered here, probably as resale material, but a lot of Welsh plates are also being offered, due to Japanese cancellation. Some Welsh makers are now inquiring for orders in the second half. Wasters are easier with sales made at 71s. for October delivery.

America has sold 40,000 tons of rails to Europe at a price c.i.f. lower than the British f.o.b. price. Shipments to Portugal have been stopped owing to the arbitrary fixing of rate of exchange by the Portuguese Government.

The galvanized sheet market is firm and unchanged and resale material is being offered by the Japanese.

We quote per gross ton except when otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.78 for £1, against $3.96 a week ago, as follows:

	£	s.		£	s.	
Ship plates	26	0	to 32	0		$98.28 to $120.96
Boiler plates	28	10	to 35	0		107.73 to 132.30
Tees	25	10	to 33	0		96.39 to 124.74
Channels	24	15	to 33	5		93.55 to 125.68
Beams	24	10	to 32	0		92.61 to 120.96
Round bars, ¾ to 3 in.	27	0	to 35	0		102.06 to 132.30
Rails, 60 lb. and up	21	0	to 23	0		79.38 to 86.94
Billets	24	10	to 25	10		92.61 to 96.39
Sheet and tin plate bars, Welsh	31	0	to 35	0		117.18 to 132.30
Galvanized sheet, 24 g.	56	0	to 60	0		211.68 to 226.80
Tin plate, base box	3	12	to 3	14		13.60 to 13.98
Steel hoops	34	15	to 35	0		131.35 to 132.30
Cleveland basic iron	10	10				39.69
West Coast hematite	13	15				51.97
Cleveland No. 3 foundry (export to allies)	10	5				38.75
Ferromanganese	35	0	to 40	0		132.30 to 151.20
Coke	2	15½				10.39

Far Eastern Markets More Active—American Competition—New Mergers

LONDON, ENGLAND, April 12.—As time goes on business does not become any easier. Indeed the tendency is for it to become more difficult almost every day. So far as raw materials are concerned, such as fuel, this is still difficult to procure in adequate quantities partly as a result of the continued congestion of the railroads, and car shortage. With reference to foreign ore, while the freight situation tends to become slightly easier, it is anticipated that prices in Spain may become higher, and so counteract any advantage that might be gained by lower freights.

Supplies of pig iron are still far below what are required. Recently arrangements were made by the Cleveland producers allotting Scottish buyers certain quantities per month, but this, it appears, is not sufficient. The demand for export continues very strong. Unfortunately it is next to impossible to meet this as makers are not inclined to put orders on their books for such trade while they are unable to satisfy urgent home requirements, which they consider of greater importance. However, it is anticipated that they may have a small though limited quantity of iron available for export during the next month or so.

Prices are unaltered, although an advance may be seen before long as iron ore miners, in addition to coal miners, are asking for increased wages. No. 1 Cleveland stands at 212s. 6d. and No. 3 G.M.B. at 200s. For France, Belgium and Italy prices are 5s. higher, while for other and free markets they may be called anything round 260s. f.o.b. The hematite position does not show much change and makers generally have their order books well filled to the end of May. The demand for both home and export continues pressing, and there are some hopes that there may be small supplies available for shipment abroad in the near future. East Coast Mixed Nos. stand at 260s. for the home trade and 265s. for the three countries already named. Scotch makers of hematite have raised their prices by 10s., making the minimum for the home trade £13.

In finished iron and steel the position continues much the same. Most makers have their order books filled and are disinclined to contract for forward delivery. Nearly every kind of material is hard to secure and the prospects of an increase in production are not bright. It is reported that the recent political troubles in Denmark, and the unfortunate conditions in Germany have reacted on the rest of the Continent, and the shutting off of supplies of coke from Germany to the Belgian works has placed that industry in an awkward position. The German Government has prohibited the export of steel altogether. It is noticeable that India and far eastern markets are again active, and good inquiries for iron and steel material have come in recently. The prospects of renewed American competition are being discussed again, but the feeling is that no serious competition can be expected from the United States before the third quarter of the year.

It is interesting to note that the Glasgow Iron and Steel Co. is reported to have been acquired by Barclay Curle & Co., Ltd., shipbuilders and engineers in association with Sir William Beardmore & Swan Hunter & Wigham Richardson. The Glasgow Iron & Steel Co. owns five blast furnaces and its output capacity of finished steel is put at about 7500 tons per week. It is also interesting to note that the directors of Swan, Hunter and Wigham Richardson lately received an offer to purchase the ordinary shares of the company at a higher price than the shares had ever brought, but the directors unanimously rejected the offer. It has been resolved by this company to increase the capital to £9,000,000 by the creation of 5,000,000 ordinary shares of £1 each. The company has recently acquired the Blaydon Iron Works.

It appears that the shareholders in Dorman Long & Co. have authorized an increase in capital from £4,500,000 to £7,500,000. It was stated by Sir Arthur Dorman that when the company was formed in 1889 the output was about 100,000 tons of steel per year. There were six undertakings under their control with output capacity of 1,250,000 tons of steel. At the first ordinary meeting of Sheffield Steel Products, Ltd., a resolution was passed increasing the capital to £2,000,000 by the creation of one million £1 shares, which are to be offered to present holders at 21s. each in the proportion of one share for each two held.

Industrial Operations Increasing

YOUNGSTOWN, OHIO, April 27.—The Republic Iron & Steel Co. has started its DeForest sheet mill plant, suspended to a large extent because of the railroad strike. The Youngstown Sheet & Tube Co. is operating 102 of its 306 by-product coke ovens, two blast furnaces and six open hearth furnaces, in addition to various finishing units. Steps are being taken by the Sharon Steel Hoop Co. to resume. Volunteer crews on all the principal trunk lines are daily increasing in number, enabling industrial operation on a larger scale.

The Newton Realty & Construction Co. has been formed as a subsidiary to the Newton Steel Co. at Newton Falls, Trumbull County, Ohio, to engage in building homes which will be sold to workmen of the company on installments. The company now has 100 houses under construction.

ORIENT CEASES BUYING

Dutch East Indies Alone Active—Europe Buys Pig Iron—South America Awaits Price Drop

Export continues quiet, particularly with companies dealing with Japanese and other far eastern markets with the exception of the Dutch East Indies, from which a heavy demand is reported for structural steel and machine tools. Formerly these buyers purchased in German markets. A Japanese export house recently offered for domestic sale a quantity of material either at mills or promised for third quarter delivery. A number of exporters are expecting the Japanese to become active again in two or three months when the present financial and industrial conditions have been surmounted. Inquiries and orders for rails are still being received from Japan and a large Japanese concern recently purchased 50,000 boxes of tin plate, $12, f.o.b. Pittsburgh. The demand from Japan for tin plate, however, is slight. Cancellations of Japanese business are few and not of special moment. A request to cancel 1000 tons of bars was reconsidered when tightness of market was explained.

European markets still show activity, several exporters making sales of small size to Sweden, England, Italy, Belgium and Holland. One order for 1000 tons of pig iron to Sweden was placed because of the promise of delivery by May 10. The demand from Sweden for wire rods is heavy at present; one exporter recently shipped 1000 tons. Italy continues to buy pig iron and bars, and some small sales of pig iron have been made to England and Belgium, one exporter having booked an order for 1000 tons to the latter market, the ultimate destination of which is Germany. Small sales of spiegeleisen have been made to Belgium, Italy and Holland, but according to one exporter doing a large business in spiegeleisen, rising prices will probably stop buying.

South American buyers are still awaiting a drop in prices and only order in small quantities. An exporter in New York was recently offered several small lots of tin plate from warehouses in Argentina and others report small sales of structural steel.

More Business with Europe

England is in the market for semi-finished steel and $72 has been offered for 10,000 tons of re-rolling billets, one-half 2 in. and the other 3 in. An Eastern mill has sold 6000 tons of 4-in. billets at $68.50.

A small tonnage of foundry iron for shipment to England was sold at $45.

Plates have been bought for both England and Holland. About 5500 tons for May-July shipment to England and 2400 tons for Rotterdam were among the week's closures, both at 4c., Pittsburgh, with the usual extra of 10c. for quality. On some 2600 tons, all 3-16 in. and in few sizes, a Middle West mill made the bookings at 3.75c., Pittsburgh.

Proposed Increase of Capital Stock of Brier Hill Steel Co.

YOUNGSTOWN, OHIO, April 27.—On April 26 the board of directors of the Brier Hill Steel Co. authorized the calling of a special stockholders' meeting to be held June 1, for the purpose of voting upon the increase of the capital stock from the present authorized issue of $15,000,000 to $50,000,000 of common stock. Before such action could be taken, under the requirements of the law, the present authorized and unissued common stock, amounting to 25,000 shares of the par value of $2,500,000, had to be disposed of either by sale or by stock dividend, states Judge J. B. Kennedy, chairman of the board and chief executive officer of the corporation.

A dividend was therefore declared in the amount of 20 per cent to the holders of common stock, such dividend going to those holders who may appear of record as of June 20, 1920. The stock distributed by this stock dividend will not be entitled to any cash dividends until after the date of its delivery, namely, July 1 next, but will be entitled to any stock dividends that may be subsequently declared on the common stock of the company.

At their meeting, June 1, stockholders will be requested to vote for the increase in capitalization, for the following purposes:—

To authorize the directors to set aside 30,000 shares of the common stock, par value $3,000,000, when so increased, for the purpose of sale to present and future employees of the company, upon such terms and conditions as from time to time the directors may decide.

Also for the declaration of a stock dividend which, together with the 20 per cent authorized, will more nearly represent, at par, the value of the company's property.

And to have in the treasury of the company ample common stock, so that it may be used as needed for the further extension of the company's properties.

The Brier Hill Steel Co. is now capitalized at $20,000,000, of which $5,000,000 is preferred. If the increase is ratified by shareholders, the capitalization will be $55,000,000.

The company is the second large independent in the Mahoning Valley to announce a plan to sell stock to employees and to increase its capital to provide for a common stock dividend.

IRON AND INDUSTRIAL STOCKS

Liquidation by Uneasy Owners Has Caused a General Decline in Prices

A combination of things bearing on industrial conditions has brought about considerable liquidation of securities during the past week, as prices as quoted to-day clearly indicate. First of all, the tightness of loanable money has influenced the market for stocks. This tightness coupled with further selling of Liberty bonds with resultant new low record prices for them, and the still uncertain railroad labor situation, as well as the inability of manufacturing interests to secure raw materials in desired quantities, and a lower range for the leading foodstuffs and commodities have contributed toward the uneasiness of securities owners.

Since last reports United States Steel common sold lower than it has since February, last, and yet its decline has been comparatively small when those in equipment stocks and general list are considered. The Corporation's statement for the quarter ending March 31, last, possibly accounts in a large measure for the showing made by the stock. Republic also has acted well, all things considered, due in part to a favorable quarterly earnings report. The showing by Lackawanna, marketwise, can be traced in a large degree to rumors that the company is to be taken over by another steel producer. Bethlehem is another steel stock which has made a comparatively good showing, its recent acquisition of coal properties undoubtedly being a market factor.

The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm. com.	37½ - 41	Lackaw. Steel....	76 - 86
Allis-Chalm. pf...	80¼ - 81⅝	Lake Sup. Corp...	16¼ - 17⅜
Am. Can com.....	40½ - 44⅜	Midvale Steel.....	42⅜ - 47¼
Am. Can pf.....	91½ - 95	Nat.-Acme	35½ - 37⅜
Am. Cr. & F. cm.	132¼ - 138½	Nat. E. & St. cm.	70 - 78
Am. Cr. & F. pf..	— - 111¼	N. Y. Air Brake..	98 - 103½
Am. Loco. com...	95 - 103¼	Nova Scotia Stl...	58 - 62
Am. Loco. pf.....	102¾ - 103⅞	Pressed Stl. com.	98 - 104⅞
Am. Stl. Fdr. cm.	40 - 43⅜	Pressed Stl. pf...	100 - 106¼
Am. Stl. Fdr. pf..	89¼ - 90	Ry. Stl. Spg. com.	93 - 98
Bald. Loco. com..	112 - 120¾	Replogle Steel....	80¼ - 86
Bald. Loco. pf....	100 - 101	Republic com.....	94½ - 107⅝
Beth. Stl. com....	85⅞ - 91	Republic pf.....	— - 97½
Beth. Stl. Cl. B...	87½ - 94¼	Sloss com.....	65 - 74½
Beth. Steel, 8 per cent. pf.....	108½ - 110	Superior Steel....	47½ - 51¼
Case, J. I., pf.....	95 - 95¼	Sup. Stl. 1st pf...	— - 101⅝
Chic. Pneu. Tool..	86 - 92¼	Transue-Williams.	56 - 58½
Colo. Fuel.....	35 - 37½	Un. Alloy Steel...	44¼ - 46½
Cruc. Steel com...	229 - 246	U. S. Pipe com...	17½ - 19
Cruc. Steel pf....	97 - 100¼	U. S. Pipe pf.....	46 - 52
Gen. Electric.....	149 - 152⅜	U. S. Steel com...	95⅝ - 102⅜
Gt. No. Ore Cert.	35 - 36¾	U. S. Steel pf.....	109⅞ - 110½
Gulf States Steel.	60 - 65	Vanadium Steel...	73 - 85⅞
Int. Har. com....	123¼ - 130	Va. I. C. & Coke.	91 - 104
Int. Har. pf.....	110¾ - 111	Westingh. Elec...	49½ - 50½

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper New York		Tin	Lead		Zinc	
April	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
21	19.25	19.25	61.50	8.80	8.45	8.35	8.00
22	19.25	19.25	61.50	8.75	8.40	8.30	7.95
23	19.25	19.25	61.50	8.75	8.40	8.30	7.95
24	19.25	19.25	....	8.75	8.40	8.30	7.95
26	19.25	19.25	61.25	8.75	8.40	8.45	8.10
27	19.25	19.25	60.50	8.75	8.40	8.35	8.00

NEW YORK, April 27.

The markets are still suffering from the effects of the railroad strike, and business is very light. The copper market is almost at a standstill and prices are largely nominal. The tin market has been quiet and very little business has been done. The situation in lead is exceedingly mixed. The zinc market is still lifeless, with prices receding. The antimony market is a little lower.

New York

Copper.—In addition to the harm done to the copper industry by the railroad strike there has been in the last week strikes in some of the leading copper mining districts and extended labor troubles at Waterbury, Conn., have completely tied up the brass industry in that city. In view of these conditions the copper market is stagnant, with no desire on the part of consumers to buy. Demand is therefore very light, and prices are largly nominal in a sluggish market. Electrolytic copper for early delivery is quoted firmly at 19.25c., New York, by the leading producers, and Lake copper is held at the same level. In the secondary or outside market there is almost no business reported, but prices are nominally considerably lower, electrolytic copper being available at around 18.37½c. to 18.50c., New York. The only activity is a fair amount of buying for export, in which several foreign countries are the purchasers. In these sales full prices are realized.

Tin.—The market is very quiet, and the amount sold has been negligible. While the shipping situation so far as the railroads are concerned is a little better, the strike has put a damper on all consuming interests and consumption has been seriously checked. Consumers continue to remain out of the market, and it is estimated that the railroad strike has caused tin consumers at least a month's output in business. There was more interest yesterday and to-day on the part of consumers and dealers in future shipments, but very little business resulted. Spot Straits, New York, was quoted at 60.50c. to-day. Prices in this market have been, as usual, regulated by the quotations in London and the value of the pound sterling. Arrivals thus far this month have been 3008 tons, and there are 3096 tons reported afloat.

Lead.—The situation in this market is very mixed. Producers are firm in their prices, and selling by them has been very light. There have, however, been offers from second hands, stated to be on account of consumers who are willing to part with some of their future delivery metal at 8c. to 8.25c., St. Louis, and a fair business at these levels is reported. Some authorities, however, regard this phase of the market as entirely speculative. On the other hand, the leading interest continues to maintain its prices at 9c., St. Louis, or 9.25c., New York. Spot lead is very scarce, due to metal held in transit because of the strike and embargoes, and anything that is offered is readily taken up. Some business in spot lead, New York, was done yesterday and to-day at from 9c. to 9.30c., New York. We quote the market for early delivery at 8.40c., St. Louis, or 8.75c., New York.

Zinc.—Prices in this market have continued to slip, due to the continued selling by exporters of metal bought on this side, but replaceable on the other side at a lower figure. Another cause has been the decline in sterling exchange which amounts to from 15 to 20 points in the last week. For these reasons prices have been erratic. On Monday prime Western for delivery in the next two or three months was quoted at 8.10c., St. Louis, or 8.45c., New York, due to an advance in the London market of about £4 per ton in the three days previous to Monday, but to-day the market was again lower at 8c., St. Louis, or 8.35c., New York, due largely to a weakness in foreign exchange. There is almost no buying by domestic consumers, and the leading producers are uninterested in the prevailing levels. This market, like all the rest, has not yet experienced much recovery from the railroad strike.

Antimony.—For the better grades in wholesale lots for early delivery 11c., New York, duty paid, is the quotation and the market is quiet.

Aluminum.—For wholesale lots for early delivery of virgin metal, 98 to 99 per cent pure, the leading producer is asking 33c., New York. By some outside interests the same grade is offered at around 31.50c., New York.

Old Metals.—There has been more inquiry and consequently a better feeling in the trade, though prices generally unchanged. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	19.00
Copper, heavy and wire	18.00
Copper, light and bottoms	16.25
Brass, heavy	14.00
Brass, light	10.00
Heavy machine composition	18.25
No. 1 yellow rod brass turnings	11.50
No. 1 red brass or composition turnings	16.00
Lead, heavy	7.75
Lead, tea	6.50
Zinc	5.75

Chicago

April 26.—Interest in buying has fallen off because of inability to ship and prices for copper, tin, lead and spelter are slightly lower than a week ago. Spelter is moving freer than the other metals because the producing district is again enjoying fairly good railroad service and some shipments can be made to destinations which can be reached without moving through the railroad centers. Old metal prices are unchanged. We quote Lake copper 19.50c. for carloads, tin 65c. to 66c., lead 8.60c., spelter, 8.25c., and antimony 12c. On old metals we quote copper wires, crucible shapes, 15.50c.; copper clips, 15.25c.; copper bottoms, 14c.; red brass, 15.50c.; yellow brass, 11.25c.; lead pipe, 7c.; zinc, 6c.; pewter, No. 1, 37.50c.; tinfoil, 40c., and block tin, 50c., all these being buying prices for less than carload lots.

St. Louis

April 26.—The non-ferrous markets have been quiet because of the railroad troubles. On car lots the quotations are: Lead, 8.30c.; spelter, 7.90c.; and in less than car lots they are: Lead, 9.25c.; spelter, 9.25c.; tin, 67c.; copper, 20c.; antimony, 12.50c. In the Joplin district zinc blende has slipped about $2.50 per ton to $47.50, basis 60 per cent. Calamine ranged during the week $35 to $37 per ton, basis 40 per cent, while lead was strong at $110 per ton, basis 80 per cent. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 9c.; heavy yellow brass, 10.50c.; heavy red brass, 15c.; heavy copper and copper wire, 16c.; light copper, 13c.; zinc, 5c.; lead, 6c.; tea lead, 3c.; pewter, 35c.; tinfoil, 43c.

The Alabama By-Products Corporation, Birmingham, Ala., recently incorporated with a capital of $5,000,000, will take over the local plant of the Birmingham Coke & By-Products Co. The plant will continue in operation for the production of coke, ammonium sulphate, benzol and kindred specialties. Morris W. Bush is president and H. L. Morrow, secretary and treasurer.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, with revisions effective from Jan. 1, 1920, in carload lots, to points named, per 100-lb. are as follows:

New York, 27c.; Philadelphia, 25c.; Boston, 29½c.; Buffalo, 21c.; Cleveland, 17c.; Cincinnati, 23½c.; Indianapolis, 24½c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; all in carloads, minimum 36,000 lb. To Denver the rate is 99c., minimum carload 40,000 lb.; Omaha, 59c., minimum carload 36,000 lb.; New Orleans, 38½c., minimum carload 36,000 lb.; Birmingham, 57½c.; minimum carload 36,000 lb. To the Pacific Coast the rate is $1.25 per 100 lb. on articles of iron and steel, minimum carloads 80,000 lb., while the structural steel rate is $1.25, minimum carload 50,000 lb., or $1.315, minimum carload 40,000 lb. The rate on ship plates, Pittsburgh to Pacific Coast, is $1 per 100-lb., minimum carload 80,000 lb. On wrought iron and steel pipe, the rate from Pittsburgh to Kansas City is 56c., to St. Paul 49½c., to Denver 99c., to Omaha 56c., all in carload lots, minimum 46,000 lb. To Jacksonville, Fla., all rail carloads, 41½c., minimum 36,000 lb., less than carloads, 59c.; rail and water, carloads 34½c., minimum 36,000 lb.; less than carloads 46½c. On iron and steel items not noted above, the rates vary somewhat, and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural size, 2.45c. to 4c.

Wire Products

Wire nails, $3.25 to $4 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 and shorter than 1 in., $2. Bright basic wire, $3 to $3.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3 to $3.50; galvanized wire, $3.70 to $3.95; galvanized barbed wire and fence staples, $4.10 to $4.45; painted barbed wire, $3.40 to $3.75; polished fence staples, $3.40 to $4.50; cement-coated nails, per count keg, $2.85 to $3.75; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$4.50 base
Large boiler rivets.....$4.60 base
Small rivets .....50 per cent off list
Small machine bolts, rolled threads,
40, 10 and 5 per cent off list
Same sizes in cut threads.....40 and 5 per cent off list
Longer and larger sizes of machine bolts,
30 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads 40 and 5 per cent off list
Cut threads .....30 and 10 per cent off list
Longer and larger sizes.....30 per cent off list
Lag bolts .....50 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....40 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜ in. x 4 in.:
Smaller and shorter.....35 per cent off list
Longer and larger sizes.....25 per cent off list
Hot pressed and cold pressed sq. or hex. blank nuts, 2c. off list
Tapped nuts .....$1.75 off list
Semi-finished hex. nuts, U. S. S. and S. A. E.:
⅝-in. and larger .....60 and 5 per cent off list
9-16-in. and smaller.....70 and 5 per cent off list
9-16-in. and smaller A. L. A. M. or S. A. E.:
70, 10 and 5 per cent off list
Stove bolts in packages.....70 and 10 per cent off list
Stove bolts in bulk.....70, 10 and 2½ per cent off list
Tire bolts .....55 and 10 per cent off list
Track bolts .....6c. base
One cent per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs 25c. extra.
All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52 to $70; chain rods, $75 to $80; screw rivet and bolt rods and other rods of that character, $65 to $70. Prices on high carbon rods are irregular. They range from $75 to $100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ to 9/16 in. and larger, $4 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ⅝-in. and 7/16-in., $4.25; 5/16-in., $5; track bolts, $4.90 to $5. Boat and barge spikes, $4.50 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, $3 to $4 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 4c. from mill. Common bar iron, 4.50c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, discounts on steel pipe applying as from Jan. 14, 1920, and on iron pipe from Jan. 7, 1920:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	47	20½	⅛ and ¼	1	+25
½	51	36½	⅜	25½	+ 1½
¾ to 3	54	41½	½	29½	11½
			¾ to 1½	34½	18½
			2 and 2½	33½	17½

Lap Weld

2	47	34½	1¼	24½	9½
2½ to 6	50	37½	1½	31½	17½
7 to 12	47	33½	2	28½	14½
13 and 14	37½		2½ to 6	30½	17½
15	35		7 to 12	27½	14½

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43	25½	¼	+7	+40
½	48	35½	⅜	23½	6½
¾ to 1½	52	39½	½	28½	15½
2 to 3	53	40½	¾ to 1½	34½	19½
			2 and 2½	34½	19½

Lap Weld, extra strong, plain ends

2	45	33½	1½	27½	13½
2½ to 4	48	36½	2	29½	16½
4½ to 6	47	35½	2½ to 4	31½	19½
7 to 8	43	29½	4½ to 6	30½	18½
9 to 12	38	24½	7 to 8	22½	10½
1¼	21½	6½	9 to 12	17½	5½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	40½	1¾ and 1⅞ in.	+20
2½ to 3¼ in.	30½	2 and 2¼ in.	+10
2¼ in.	24	2½ and 2¾ in.	+ 1
1¾ to 2 in.	19½	3 and 3¼ in.	— 1½
		3½, 4 and 4½ in.	— 8

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ to 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills have no trouble in getting prices quoted in the right-hand column, or even higher prices.

Blue Annealed—Bessemer

	Cents per lb.
No. 8 and heavier	3.50 to 5.95
Nos. 9 and 10 (base)	3.55 to 6.00
Nos. 11 and 12	3.60 to 6.05
Nos. 13 and 14	3.65 to 6.10
Nos. 15 and 16	3.75 to 6.20

Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 to 21	4.15 to 6.30
Nos. 22 to 24	4.20 to 6.35
Nos. 25 and 26	4.25 to 6.40
No. 27	4.30 to 6.45
No. 28 (base)	4.35 to 6.50
No. 29	4.45 to 6.60
No. 30	4.55 to 6.70

Galvanized Black Sheet Gage—Bessemer

Nos. 10 and 11	4.70 to 7.50
Nos. 12 to 14	4.80 to 7.60
Nos. 15 and 16	4.95 to 7.75
Nos. 17 to 21	5.10 to 7.90
Nos. 22 to 24	5.25 to 8.05
Nos. 25 and 26	5.40 to 8.20
No. 27	5.55 to 8.35
No. 28 (base)	5.70 to 8.50
No. 29	5.95 to 8.75
No. 30	6.20 to 9.00

Tin-Mill Black Plate—Bessemer

Nos. 15 and 16	4.15 to 6.15
Nos. 17 to 21	4.20 to 6.20
Nos. 22 to 24	4.25 to 6.25
Nos. 25 to 27	4.30 to 6.30
No. 28 (base)	4.35 to 6.35
No. 29	4.40 to 6.40
No. 30	4.40 to 6.40
Nos. 30½ and 31	4.45 to 6.45

Heavy Iron Ore Movement Is Expected

Lake Superior Mining Companies Estimate Shipments Will Amount to 70,000,000 Tons—Developments in Regard to Lean Ores—Magnetic Separation

DULUTH, MINN., April 26.—Railroad and mine schedules for the Lake Superior ore region look like shipments of about 70,000,000 tons this year. That is the total which the mining companies have set as their expectation, which will be fulfilled if conditions do not change and there are no serious labor or other difficulties. The rail schedules for the various Minnesota ore carrying roads follow:

	Tons
Duluth, Missabe & Northern	20,000,000
Great Northern	16,000,000
Duluth & Iron Range	11,000,000
Soo Line	1,500,000
Northern Pacific	1,000,000

Expectations of shipments from the Michigan and northern Wisconsin ranges are:

	Tons
Gogebic range	9,000,000
Menominee range	6,500,000
Marquette range	4,500,000

Some authorities on the Gogebic expect the district to reach not less than 10,000,000 tons, and it already has shown a capacity for nearly the 9,000,000 tons figured above, while both the Menominee and Marquette have surpassed the figures given them above. The Soo Line really hopes to move at least 2,500,000 tons and the Northern Pacific more than specified above. Some 3,000,000 tons of that which the Duluth & Iron Range is down for is from mines that have been handled in the past by the Duluth, Missabe & Northern, and are switched to the other road this year in order to assist the Missabe. The Great Northern's expected total is much more than it ever has handled in the past, and there are some who doubt its capacity for this amount, but the road has made a new deal at its shipping docks, putting them on a profit-sharing basis somewhat similar to that at its head of the Lakes flour docks, under the Peppard-Fulton Co., of Minneapolis, which will take over the entire charge of the docks. There has been much dissatisfaction at the manner of handling ore over these docks, which culminated last fall in an appeal to the directors, at New York, and this change doubtless is the result. Above all, the labor troubles at head of the Lake ore docks for the past few years have originated at the Great Northern, and have spread, if at all, from there. Work at these docks is harder and more unsatisfactory than at others, partly on account of the type of cars used, and dock laborers have not been satisfied with conditions. The new deal means, in part, perhaps, an attempt to eliminate the dock union there. Just how this will work out is a question.

The only labor difficulty in sight in the upper Lake region just now is that with dockmen, and those at Two Harbors have made demands for 75, 77.5 and 80c. per hour, for the three shifts of work. Last year's pay was 55c. per hour. At other docks there has been no demand yet.

Exploiting Lean Ores

Some years ago a company was organized to undertake the exploitation of the extensive lean, banded hematite, silicious iron ore formation of Mount Whittlesey, near Mellen, Wis., on the western end of the Gogebic range. At that point exists a very large outcropping deposit of this material, running from 44 to 50 per cent iron and very high in silica, but Bessemer. It was the plan of the promoters of this company, which sold its stock throughout northern Minnesota and Wisconsin to people who were not in the mining game, to erect a mill and crush and jig this material, making a product of about 55 per cent iron, say 12 per cent silica and about 0.020 phosphorus. The mill was built at a cost of more than $300,000 and railroad connection was made to the Soo Line by the mining company, as the Soo refused to do the work at its own expense, and a large quarry was opened on the hillside. No concentrates have been shipped, but a trifling quantity, if any, has been made, and the future of the enterprise is somewhat in doubt. Mining men acquainted with the beneficiation of iron ores have not been enthusiastic over the project, recognizing the difficulty of beneficiating hematite ores on a commercial basis. A short distance west of this property the Gogebic formation changes from hematite to magnetite, and a large sum has been expended recently in drilling to see if the work of the Mesabi Iron Co. on the magnetites of the Mesabi might be duplicated. But the rock was found to be too lean, even for that, and the available portions of the formation did not lend themselves to economical handling. The enterprise has been abandoned.

Magnetic Concentration

Much misunderstanding exists among iron ore men as to the possibilities of magnetic concentration in the Lake Superior region. The work of the Mesabi Iron Co. has led many, cursorily informed on the situation, to believe that there are billions of tons of material in northeastern Minnesota and northwestern Wisconsin available for this beneficiation, and they point to the loose estimates of tonnages of titaniferous magnetites in Lake and Cook counties, Minnesota, as showing favorable potentialities. This seems to be erroneous. In the first place no one knows as to these titaniferous ores; they are magnetic segregations in the great gabbro inundation, and the limit of their tonnages varies with the price of ore and the cost of concentration. They are segregations, as stated, and there is no ground for knowledge of the depths to which the available ore may reach. Estimates of tonnages that have been made are the wildest guesses and are not based on any scientific deductions whatever. There may be as much ore as some think, and there may not. In the second place, the ores are titanium bearing, and the titanium is contained as an ilmenite, so that in magnetic concentration tailings losses must be high, while it will be practically impossible, so far as is now known, to eliminate more than a portion of the titanium. While the prejudice of furnace men against titanium probably is beyond reason and is not based on sufficient, exact and modern data, nevertheless it exists; and the iron ore producer who attempts to educate the furnace man to the use of an ore that he does not like and is not driven to try, will probably go broke in the effort.

Possibilities of Distant Future

That the time will come when these titaniferous ores will be used to the full extent of their ultimately commercial tonnages, there is little doubt, but that this time is near at hand, is very questionable.

Aside from these titaniferous ores the volume of magnetic ores in northern Minnesota amenable to commercial concentration by magnetism is comparatively slight, and the bodies are widely scattered, for the most part, too much so and in too many ownerships to expect that they can be utilized by a method that requires for its success a very large operation.

There are dreams that lean hematites of the older ranges may be made subject to magnetic separation by magnetizing the rock before separating it, and such treatment is possible, theoretically and in the laboratory; it is very questionable if it is commercially practicable at this time or that it may become so at any early period. Many such deposits exist; Mount Whit-

lesey is one, the Kloman of the Marquette district another, and there are numerous examples throughout the region.

The Hanna Ore Co. is increasing its capital from $1,000,000 to $4,000,000 and its limit of indebtedness similarly. This is the company that operates a number of Great Northern leases on the Mesabi range, and is now developing the Wabigon mine, near Buhl, a Great Northern property. M. A. Hanna & Co. have taken over Empire mine, near Palmer, Mich., a low-grade silicious ore. Hanna interests will operate some 20 Lake Superior mines this season.

Stockpiles at the opening of navigation aggregate some 3,250,000 tons on the Gogebic, and 500,000 tons on the Vermillion. Vessels from lower Lakes arrived in Lake Superior April 10, but met ice near the Sault, and were some days getting to Duluth. Ore loading into upper Lake docks has been under way since about April 1. The first ship left Duluth April 11 for Two Harbors, thence to Erie.

COAL PRODUCTION

World's Output Declines to that of 1910—Effect of the Railroad Strike

WASHINGTON, April 27.—The effect of the railroad strike on the coal and coke industry is shown by figures for the week ended April 17, issued by the Geological Survey. The beehive coke producers were harder hit than either the bituminous or the anthracite mining industry. Production of beehive coke during the week ended April 17 is estimated at 244,000 net tons, a decrease of 233,000, or 49 per cent, when compared with the preceding week. The decrease was sharpest in Pennsylvania and northern West Virginia. The cumulative production since Jan. 1 is now 6,671,000 tons, as compared with 6,849,000 tons during the corresponding period of last year.

Production of bituminous coal fell off nearly 2,000,000 tons during the week ended April 17. The total production of bituminous coal during the week of April 17, including lignite and coal coked, is estimated at 7,668,000 net tons. The output of the corresponding week in 1919 was 7,411,000 tons, and in 1918 it was 10,901,000 tons. The Illinois and Indiana districts were the most affected by the strike. The shipments of anthracite by the nine principal carriers during the week were reported as 24,920 cars, as against 28,972 during the week of April 10. This indicates a total production of 1,280,000 net tons, a decrease of 208,000 tons, or 14 per cent, compared with the previous week.

A compilation of figures from various nations shows that the world production of coal in 1919 seems to have dropped back to the level of 1910. Preliminary estimates placed the total output of all mines of coal in 1919 at 1,170,000,000 metric tons, or 1,290,000,000 net tons. This is 162,000,000 metric tons less than the production in 1918, the last year of the world war, and about 171,000,000 tons less than that of 1913, the year before the war began.

From 1913 to 1919 the output of bituminous coal in France, Belgium, Germany, and the United Kingdom fell off from 532,000,000 metric tons to 386,000,000, a decrease of about 20 per cent in the United Kingdom and Belgium, and nearly 40 per cent in Germany. In the Saar Valley, whose output appears to have fallen from 12,000,000 tons in 1913 to about 8,000,000 in 1919, the decrease was over 30 per cent. The reduction in the French output is mainly due to the destruction of the mines in the Nord and Pas de Calais. The output of lignite in Germany in 1919, though less than in 1918, was still greater than before the war, being 94,000,000 tons, as compared with 87,000,000 in 1913.

In the break-up of Austria-Hungary the bulk of that country's coal and lignite, the production of which before the war amounted to about 55,000,000 tons, was inherited by the Republic of Czecho-Slovakia, and the 1919 production of Czecho-Slovakia was about one-third less than the same territory produced in 1913.

New Plants for Sintering Fine Ores

The American Ore Reclamation Co. has issued a license for the use of the Dwight and Lloyd sintering process to the Wharton Steel Co. at its works at Wharton, N. J. The plant, which will be erected under the direction of Arthur G. McKee & Co., Cleveland, will consist of a primary installation of two double-length sintering machines with a capacity of approximately 700 tons of sinter per day from ore concentrates and flue dust. The installation will be made with a view to increasing later to six machines.

Another recent license is that to the Otis Steel Co. at Cleveland, which will install one double-length Dwight and Lloyd sintering plant at its Riverside furnace with a capacity of approximately 300 tons of sinter per day from blast furnace flue dust.

Two Carbon Tool Steels, One Made from Detinned Scrap

The Electric Furnace Construction Co., Philadelphia, has received from its British office the following statement on some comparative tests of two plain carbon tool steels made as described:

I enclose herewith the test from the university regarding detinned scrap, which was converted into tool steel in a Greaves-Etchells electric furnace and which was sent to the university together with a piece of the highest grade crucible steel made from Swedish base. You will note that the electric steel is slightly better than the crucible steel.

The report of the tests as signed by the senior lecturer in metallurgy of the University of Sheffield is as follows:

These two steels were tested on a mild-steel bar by means of the speed increment test, in which the starting speed was 20 ft. per min., the speed increment 1 ft. per min., the depth of cut ⅛ in., and the feed per revolution 1/60 in. Each tool was tested three times, the following being the mean results of the tests:

Tools	Average Test Duration, Min.	Sec.	Average Breakdown Speed, in Ft. Per Min.	Aver. Vol. of Metal Removed Up to Breakdown in Cu. In.
Electric	18	57	59.2	18.8
Crucible (cast)....	18	47	58.8	18.6

There is but little difference between the two steels from the point of view of durability and cutting power and each is a good average plain carbon tool steel.

Increased Use of Electricity

Stuart M. Anson, Worcester representative, Westinghouse Electric & Mfg. Co., in a recent address on the Age of Electricity before the Kiwanis Club, Worcester, Mass., said in part:

"It is very interesting and significant to note the expansion and growth of electricity in some of the basic industries. Take the steel industry. In the two years previous to the war, 1913 and 1914, the steel industry added 80,000 horsepower in electric motors for the main mill drives. In a corresponding period of two years, namely, 1918 and 1919, there were added 400,000 horsepower. In 1914, the total electric horsepower was 280,000. Five years later the total horsepower installed was 1,042,000, or an increase of 400 per cent in five years."

The Atlas Tack Corporation, Fair Haven, Mass., has acquired the H. C. Tack Co., Cleveland, effective May 1, at a price in the neighborhood of $600,000. Present plans call for increases in the production capacity of both the Fair Haven and Cleveland plants.

Operation of the Keystone furnace of the Reading Iron Co., Reading, Pa., was resumed last week following the receipt of a shipment of coke. Operation of the tube mill will be started again within the next several days.

PERSONAL

Robert A. Walker, resident editor of THE IRON AGE at Pittsburgh, has been granted a leave of absence for the last half of the year for a sojourn in Canada and a visit to the Pacific Coast for the benefit of his health. In connection with the meeting of the editorial staff in New York on April 23 he was made the guest of honor at a dinner held in the evening, and the speeches together with a presentation to him were all directed to his long service and unswerving faithfulness to the interests of this journal. He has been identified with the Pittsburgh office continuously for 34 years, and, with a few brief interruptions, for 44 years. He underwent an operation last fall and has not yet fully recovered his physical strength.

Harry A. Hey, for the last five years with the Singer Mfg. Co., Elizabethport, N. J., and earlier assistant secretary of the American Society of Mechanical Engineers, has been appointed manager of sales in the eastern territory for the Illinois Tool Works, Chicago, manufacturer of milling cutters, hobs and reamers. His headquarters are at 127 Water Street, New York.

W. F. McLaughlin, general superintendent Hyatt Roller Bearing Division, General Motors Corporation, Newark, N. J., is leaving this position to become works manager of the Ace Motors Corporation, Philadelphia, manufacturer of four-cylinder motorcycles. He has been with the Hyatt company for six years.

Joseph Bean, mill superintendent of the McDonald plant, Carnegie Steel Co., has resigned to go to the Trumbull Steel Co., Warren, Ohio, having been at the former plant since it started operations two years ago. The employees of the McDonald plant presented him a watch and chain.

George A. Laub, for 20 years with the American Car & Foundry Co., Berwick, Pa., has assumed his duties as superintendent of the Sligo Iron & Steel Co., Connellsville, Pa.

Orville Wright has been awarded the John Fritz medal this year, and the presentation will take place in the Engineering Societies Building, New York, Friday evening, May 7.

After submitting to an operation for appendicitis which confined him to the hospital for five and one-half weeks, I. Lamont Hughes, general superintendent Carnegie Steel Co. in the Youngstown district, has been removed to his home. For a time his life was despaired of. Mr. Hughes' illness followed closely upon his assuming charge of the Carnegie company plants at Youngstown, succeeding James H. Grose.

H. J. Crean, assistant secretary-treasurer Fisher-Wilkie, Ltd., Sandwich, Ont., Can., has been appointed assistant to the president of the Collier Motor Truck Co., Bellevue, Ohio, and will assume his new duties at once.

Dr. Paul C. Doerr, C. F. Houghton Co., Philadelphia, addressed the Milwaukee section of the American Steel Treaters' Society at its monthly meeting on April 20, his subject being, "The History and Present Knowledge of Carburizing Materials."

A. L. De Leouw has associated himself in an advisory capacity with the Illinois Tool Works, Chicago, and will be located at its New York branch, 127 Water Street. Cutting and milling problems will be handled by Mr. De Leouw in the eastern district. High speed steel tools will also be carried by the Illinois Tool Works in its new and enlarged quarters.

C. H. Norton, chief engineer Norton Co. grinding machine division, Worcester, Mass., addressed the Cleveland Engineering Society April 27 on "Grinding Developments, Achievements, and Future Possibilities."

Arthur W. Berresford, second vice-president and general manager Cutler-Hammer Mfg. Co., Milwaukee, who has been nominated without opposition for the presidency of the American Institute of Electrical Engineers, is 46 years of age and has been associated with the Cutler-Hammer company for 21 years, having become general manager in 1906. The fact of his nomination was made public by Calvert Townley, president of the institute, when he was guest of honor at the monthly meeting of the Engineers' Society of Milwaukee on April 20.

The nominating committee of the Cleveland Engineering Society, Cleveland, Ohio, has selected the following list of candidates for officers for the ensuing year, and the men will be formally elected by a vote of the members: President, W. J. Carter, consulting engineer; vice-president, F. H. Vose, professor of mechanical engineering, Case School of Applied Science; directors, B. D. Quarrie, mechanical engineer American Steel & Wire Co.; F. E. Bissell, civil engineer, and F. L. Sessions, consulting engineer.

Ralph E. Hubby and Charles V. Hubby of the Petroleum Iron Works Co., Youngstown, Ohio, have gone to Buenos Aires, South America, where the company is erecting a number of 55,000 gallon oil tanks which were fabricated by the Petroleum company.

The Kennedy Valve Mfg. Co. announces the appointment of C. H. Kennedy, mechanical engineer, formerly New York district manager, as general sales manager, with headquarters at the plant, Elmira, N. Y. Mr. Kennedy's place in New York has been taken by J. S. Hanlon, formerly Boston representative, and George W. Waters, formerly in the sales department of the New York office, has been made Boston representative. An additional sales office has been opened at 208 Mutual Building, Kansas City, with F. N. Decker in charge. Mr. Decker has been for many years with the plant at Elmira.

Walter J. Frost, president Frost Mfg. Co., brass founder, Kenosha, Wis., was re-elected president of the Kenosha Manufacturers' Association at the annual meeting on April 15. Other officers were elected as follows: Vice-president, George S. Whyte, president Macomber & Whyte Rope Co.; secretary, Conrad Shearer; directors, Charles W. Nash, president Nash Motors Co.; Z. G. Simmons, president Simmons Co.; George A. Yule, president Bain Wagon Co.; L. T. Hannahs and C. C. Allen.

F. A. Calhoun, formerly sales engineer for the Tate-Jones & Co., Inc., in the New York district, has resigned to accept a position as Eastern representative in the New England and Middle Atlantic states for the Standard Fuel Engineering Co., Detroit, for its heat treating furnaces. Offices are in the Lincoln Trust Co. Building, 76 Montgomery Street, Jersey City, N. J.

Richard Garlick, treasurer Youngstown Sheet & Tube Co., Youngstown, Ohio, has resumed his duties after spending the winter in the South in the interests of his health.

Daniel C. Roper, former United States Commissioner of Internal Revenue, has been elected president and a director of the Marlin-Rockwell Corporation, New Haven, Conn. Other new directors elected are Thomas L. Chadbourne, Joseph A. Bower, New York, and A. J. Brosseau, president International Motor Truck Corporation. A. F. Rockwell, former president of the corporation, has been elected chairman of the board of directors.

F. F. Beall, for several years vice-president in charge of manufacturing of the Packard Motor Car Co., has been elected president of the Gray Motor Corporation, a newly formed $4,000,000 automobile concern.

W. H. Patterson, manager resale section, Westinghouse Electric & Mfg. Co., East Pittsbugh, has been appointed assistant-to-manager, industrial department, in charge of metal working and wood working industries. Mr. Patterson was graduated from the electrical engineering course of Purdue University in 1905. In January, 1906, he entered the apprenticeship course of the Westinghouse company. In 1910, he was made manager of the resale section. Mr. Patterson has been identified for some years with the development of motors and control apparatus for application to cranes, elevators, hoists, and machine tools. During the war, he served on the United States Shipping Board, Emer-

gency Fleet Corporation, electric welding committee. When the American Welding Society was formed about a year ago, he was elected a director. He is also a member of the American Institute of Electrical Engineers, National Electric Light Association, Pennsylvania Electric Association, American Society of Refrigeration Engineers, and Association of Railway Electrical Engineers.

E. C. Rutz and P. E. Widsteen, formerly with the Woodmansee-Davidson Engineering Co., announce the incorporation of the R & W Construction Co., which will specialize in power plant and transmission line construction for public utility and industrial development work. Offices have been opened at 35 South Des Plaines Street, Chicago.

Andrew J. Morrison, engineer of works J. Stevens Arms Co., Chicopee Falls, Mass., has resigned, effective May 1, to accept a position of similar nature with the International Motor Truck Co. of New Brunswick, with factories at Allentown, Pa., Plainfield and New Brunswick. Associates at the Stevens plant last week presented Mr. Morrison a gold watch and a smoking set.

Hollinshead N. Taylor, N. & G. Taylor Co., manufacturer of forging steel, Philadelphia, president Drop Forge Supply Association, has appointed Stuart Hazlewood, Midvale Steel & Ordnance Corporation, and George Satterthwaite, Tacony Steel Co., to represent the association upon a committee in charge of the arrangements for the coming joint meeting of this association with the American Drop Forge Association at the Marlborough-Blenheim Hotel, Atlantic City, June 17, 18 and 19.

H. I. Quinn has been appointed general purchasing agent and district manager for the Northwest Trading Co., oversea merchant, Chicago, with offices at 72 West Adams Street, Chicago. Mr. Quinn succeeds H. G. Powers.

C. H. Norton, chief engineer Norton Co., Worcester, Mass., on April 23 addressed the Steel Treating Research Society, Hartford, Conn., on grinding heat treated steel, at the Hartford Chamber of Commerce.

The Packard Motor Car Co. announces that E. F. Roberts has been appointed vice-president in charge of manufacturing. He has been with the comapny 17 years, beginning as a toolmaker when the plant was at Warren, Ohio. He became superintendent in 1911 and factory manager in 1914. He succeeds F. S. Bell in his new position.

Brent Wiley, manager steel mill section, industrial department, Westinghouse Electric & Mfg. Co., East Pittsburgh, has been appointed assistant-to-manager, industrial department, in charge of mill industries. Mr. Wiley, after graduating from the Rose Polytechnic Institute, Terre Haute, Ind., in 1898, entered the electric department of the Ohio Works, Carnegie Steel Co., where he stayed one year, and was then transferred to the Homestead works of the company as assistant to the electrical engineer. For two years Mr. Wiley was electrical engineer for the Wellman-Seaver-Morgan Co., Cleveland. In 1906, he became associated with the Westinghouse company as commercial engineer, engaged in steel mill work, industrial and power department. Mr. Wiley was appointed manager of the steel mill section in 1909, which position he has held until his recent appointment. He is a member of the American Institute of Electrical Engineers, American Iron and Steel Institute, Association of Iron and Steel Electrical Engineers, American Electrochemical Society, Electric Furnace Association and the Engineers' Society of Western Pennsylvania.

A. C. Deverell, superintendent of motive power, the Great Northern Railroad, St. Paul, Minn., has been appointed Western sales manager of the Locomotive Stoker Co., with headquarters at Chicago. H. C. Woodbridge, supervisor in the fuel conservation section of the Railroad Administration, will represent the same company at Pittsburgh, and J. J. Byrne has been placed in charge of the office at Washington.

The Abrasive Co., Philadelphia, Pa., at its recent directors' meeting elected the following officers: Frederick S. Dickson, chairman of the board; Louis T. Byers, president; J. Harvey Byers, vice-president and general manager; Lawrence J. Morris, vice-president; Samuel P. Byers, secretary and treasurer; Thomas F. Muldoon, assistant secretary and treasurer.

Sheet metal contractors of the New England states have organized under the name of the Federation of Sheet Metal Contractors of New England with Robert J. Braley, Braley & McLaughlin, Providence, R. I., president.

OBITUARY

GEORGE W. KETTER, who was in charge of electrical installations for the Electric Furnace Construction Co., Philadelphia, died at Claremont, N. H., on April 22, after a short attack of pneumonia. He was a graduate of the Carnegie Technical School, and he had been actively connected with the practical electrical side of electric furnace plant for the past eight or ten years, and among his installations are the plants at British Forgings, Ltd., Toronto; Anniston Steel Co.; Michigan Steel Castings Co.; U. S. Navy Yards at Puget Sound, Mare Island, Norfolk, Charleston and Philadelphia; Ford Motor Co.; American Radiator Co.; Halcomb Steel Co.; Dodge Steel Co. and Hammond Steel Co.

JAMES MORRISON, president of the O. L. Packard Machinery Co., Milwaukee, Wis., died April 13 at the age of 79 years. He was a native of Scotland and came to America 45 years ago, settling in Milwaukee.

ERIC RIDSTROM, secretary-treasurer of the Western Machine Co., 248 Fourth Street, Milwaukee, Wis., passed away April 13 after an illness of only five days.

WILLIAM I. MCMARTIN, president and general manager Western Steel Products Ltd., Winnipeg, Man., Can., and founder of the Winnipeg Ceiling & Roofing Co., Ltd., the original of the present institution, died April 11.

Fairbanks, Morse & Co., Chicago, showed a net income in 1919, after deducting all charges and federal taxes, of $3,289,254. After paying preferred dividends, the balance was equivalent to 127 per cent on the $2,500,000 common stock. Since the date of the annual report, the common stock has been increased from 25,000 shares of $100 par value to 325,000 shares of no par value. Stockholders were given 10 shares for each old share, 22,617 shares were sold to employees, 37,500 shares were sold publicly, and the rest retained in the treasury.

Stockholders of the Harbison-Walker Refractories Co. will hold a special meeting on June 23 to vote on the proposition to increase the capital from $27,600,000 to $36,000,000. If ratified, a 50 per cent stock dividend on the common stock will be paid to the stockholders on July 15, of record July 5. The company has declared a quarterly dividend of 1½ per cent on the preferred and common stock.

The city of Johnstown, Pa., will not generally adopt the daylight saving plan, as there has been very much opposition to it. Recently the Cambria Steel Co. issued a notice that it would adopt the daylight saving plan, but has cancelled this order and gone back to the old schedule. Any concern that desires to move its time forward one hour will do so, but the plan will not be generally observed.

With the recent resumption in operations of additional blast furnaces and a battery of coke ovens at the Steelton, Pa. plant of the Bethlehem Steel Co., operation is at the highest point since February, 1919, when large Government contracts were completed. Four of the six blast furnaces and the entire group of coke ovens are now in full operation.

STEEL CORPORATION EARNINGS

Best Showing Since the Third Quarter of 1918—Usual Dividends Declared

The report of the United States Steel Corporation for the first quarter of the year 1920 shows that in spite of the low prices being asked by the Corporation's subsidiaries, the net earnings were the largest for any quarter since the third quarter of 1918, being $42,089,019 compared with $35,791,302 for the fourth quarter of 1919 and $36,354,165 for the fourth quarter of 1918. March was the month of largest earnings of the quarter. The net earnings for the first quarter of 1920 and for the three preceding years have been as follows:

Quarters	1920	1919	1918	1917
First	$42,089,019	$33,513,384	$56,961,424	$76,756,018
Second	.....	34,331,301	62,557,391	90,579,204
Third	.....	40,177,232	42,961,589	68,243,784
Fourth	.....	35,791,302	36,354,165	59,724,125
Net earnings each year	.....	$143,813,219	$198,834,569	$295,303,131

The usual dividends of 1¾ per cent on preferred and 1¼ per cent on common were declared.

The statement of the earnings for the quarter ending March 31 is as follows:

Statement of United States Steel Corporation and Subsidiary Companies for the Quarter Ending March 31, 1920.

EARNINGS

	Earnings before charging interest on Subsidiary Bonds	Less: Interest on Subsidiary Bonds	Balance of Earnings
January, 1920	$14,211,147	$707,938	$13,503,209
February, 1920	13,587,975	707,065	12,880,910
March, 1920	16,412,898	707,998	15,704,900
	$44,212,020	$2,123,001	
Net earnings			$42,089,019
Less charges and allowances for depreciation			10,765,318
Net income			$31,323,701
Deduct: Interest for the quarter on Steel Corporation bonds		$5,079,816	
Premium on bonds redeemed		212,100	
			$5,291,916
Balance			$26,031,785
Dividends on stocks of Corporation: Preferred, 1¾ per cent		$6,304,919	
Common, 1¼ per cent		6,353,781	
			12,658,700
Balance of surplus for the quarter			$13,373,085

Republic Earnings

The Republic Iron & Steel Co. earned an equivalent of $4.45 per share on the common stock for the first quarter of 1920, compared with $2.26 per share during the equivalent period of the year before. Unfilled orders on March 31, 1920, totaled 514,451 tons, against 486,379 tons on Dec. 31, 1919. Surplus for the quarter was $889,817. Net profits applicable to dividends amounted to $1,777,317.

Stock Dividends Expected

Capital stock increases to provide for common stock dividends and the setting aside of blocks of stock for purchase by employees have been discussed within the past week by directors of the Youngstown Sheet & Tube Co. and the Brier Hill Steel Co. at Youngtown. In the case of the Sheet & Tube company, a 300 per cent stock distribution is reported likely, while the Brier Hill dividend is estimated at from 150 to 200 per cent. It is the purpose of some directors to figure an increase which will make the capitalization conform to the actual assets. The Sheet & Tube company has gross assets of about $100,000,000, while recent inventory is said to have disclosed assets for the Brier Hill Steel Co. in excess of $60,000,000.

The Brier Hill company is capitalized at $20,000,000 represented by $15,000,000 common and $5,000,000 preferred, only $12,500,000 of the common being issued. The Sheet & Tube company is capitalized at $30,000,000, of which $20,000,000 is common and $10,000,000 preferred. Of the common $18,496,000 is issued.

During its history the Youngstown Sheet & Tube Co. has distributed two common stock dividends, one to holders of record July 31, 1909, which amounted to 30,000 shares of common, par value $100, at the rate of 50 per cent on the stock then outstanding. The second was distributed June 30, 1913, consisting of 50,000 shares of common, or at the rate of 50 per cent on the then outstanding stock. At the annual meeting in 1917 the directors authorized a 100 per cent common stock dividend, but later rescinded this action.

Steel Corporation's Orders Continue to Increase

Unfilled orders on the books of the United States Steel Corporation, March 31, were 9,892,075 tons, compared with 9,502,081 tons on Feb. 28. This is an increase of 389,994 against one of 216,640 tons in February and 1,020,075 tons in January and against an increase for December of 1,137,036 tons. The increase last month is the tenth consecutive one. The unfilled orders a year ago were 5,430,572 tons, or 4,461,503 tons less. The table below gives the unfilled tonnage for the Steel Corporation at the close of each month beginning with January, 1917:

	1920	1919	1918	1917
January	9,285,441	6,684,268	9,477,853	11,474,054
February	9,502,081	6,010,787	9,288,453	11,576,697
March	9,892,075	5,430,572	9,056,404	11,711,644
April	.....	4,800,685	8,741,882	12,183,083
May	.....	4,282,310	8,337,623	11,886,591
June	.....	4,892,855	8,918,866	11,383,287
July	.....	5,578,661	8,883,801	10,844,164
August	.....	6,109,103	8,759,042	10,407,049
September	.....	6,248,638	8,297,905	9,833,477
October	.....	6,472,668	8,353,293	9,009,675
November	.....	7,128,330	8,124,663	8,897,106
December	.....	8,265,366	7,379,152	9,381,718

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons; the lowest was on Dec. 31, 1910, when the total was 2,605,747 tons.

Jamison Company Sells Coal Lands

PITTSBURGH, April 27.—The Jamison Coal & Coke Co., Oliver Building, Pittsburgh, has sold to the Penn Mary Coal Co., an interest of the Bethlehem Steel Corporation, about 7000 acres of coal lands in the Fairmont, W. Va., region. This is Pittsburgh seam coal and especially suitable for making gas and by-product coke. The sale also includes two large coal plants known as Barrackville and Dakota and includes company houses and all equipment; in fact, everything connected with these two large coal plants. The Jamison Coal & Coke Co. still owns about 8500 acres of high-grade coal lands in West Virginia in addition to its valuable coal and coke properties in the Connellsville region, which the company will continue to operate.

Toronto Chapter of Steel Treaters Organized

The Toronto Chapter of the American Steel Treaters' Society was organized by the executive secretary of the national organization, W. H. Eisenman, on April 20, at Toronto, Canada. The first meeting was held that evening at the King Edward Hotel and the attendance was large. The chairman of the new chapter, the 20th in the organization, is J. H. Moore, associate editor *Canadian Machinery*, with H. A. Phillips, mechanical engineer, Canada Cycle & Motor Co., as vice-chairman and A. Lowry, chemist, Massey-Harris Co., as secretary-treasurer. The executive committee consists of Charles N. Dawson, Metallurgist Machine & Stamping Co.; Chester Hamilton, president Hamilton Gear & Machine Co.; Charles Hack, chief inspector Canadian Allis-Chalmers Co., and W. O. Oliver, superintendent Steel Company of Canada.

Arthur G. McKee & Co., engineers and contractors, Cleveland, have received from the Wharton Steel Co. an order for a McKee standard 50-ton transfer car. This car will be operated at the plant of the Wharton Steel Co. at Wharton, N. J., which plant is at present being redesigned and rebuilt by McKee & Co.

SLOWLY PICKING UP

Operations in the Mahoning Valley Improving—Few Cause Trouble

YOUNGSTOWN, OHIO, April 27.—In the third week of the unprovoked strike of a comparatively small number of railroad workers, operations of iron and steel producers in the Mahoning Valley are gradually picking up. The Youngstown Sheet & Tube Co. had two of six blast furnaces pouring at the beginning of the week, the Republic Iron & Steel Co. two of five in the Hazelton group, the Carnegie Steel Co. three of six at the Ohio Works and the Brier Hill Steel Co. one of three at the Brier Hill plant. All of the Brier Hill company's 28 sheet mills are rolling, but its 132-in. plate mill, which had been in commission, suspended this week. The 84-in. mill is rolling. Upper and Lower Union mills of the Carnegie company are idle, but the Bessemer converting mill and 43-in. mill are in operation. The Sheet & Tube Company had six out of 12 open-hearth furnaces active last week, and a number of finishing departments. The Republic company started several finishing units this week. Sharon Steel Hoop Co. units continue inactive.

In the Shenango Valley the Sharon and Farrell plants of the Carnegie Steel Co. are operating on a much improved scale, while the American Sheet & Tin Plate Co. reports better schedules. Conditions are much more favorable than in the Mahoning Valley.

Volunteers Are Helpful

Switching crews, which enabled resumption of schedules at Youngstown on a small scale, have, up to this time, been made up chiefly of officials and volunteers. With improvement in other parts of the country, railroad authorities have taken steps to break the strike in the Youngstown district by importing crews. While rank and file of the strikers have made no effort to resume their posts, a number have deserted here and there, believing that it is futile for the men to longer hold out.

Pressure is being exerted to have the men see the error of their ways and resume work pending settlement of their wage claims.

Steel continues to pile up and it is estimated close to 225,000 tons are on the ground at Valley mills.

During the past three months the Brier Hill Steel Co. has made one of the best production records in its open-hearth department and its sheet mills in its history, in face of unusual operating difficulties. This record is attributed to the fact that the company has been improving its operating personnel, which is headed by James H. Grose, president, one of the most successful operating executives in the country. Sales of its product during this period have been proportionately large.

The Trumbull Steel Co. at Warren has also maintained heavy production in an effort to keep up with cumulative demand for sheets and tinplate.

On April 22 the Truscon Steel Co., fabricator and manufacturer of various steel products, was compelled to largely suspend because of steel shortage. Other district fabricators have managed to keep going.

Use of Motor Trucks

The motor truck is being resorted to in this emergency and is proving its value as a transportation medium. For instance, several cars of raw materials have been transferred to Carnegie plants by the use of trucks. Some shipments of steel have been made to nearby consumers by truck, although the limitations in this procedure are readily apparent.

The Republic Iron & Steel Co. is operating its mines in Pennsylvania, stocking the larger part of the output and selling some of it on the market.

Deliveries Delayed

The larger part of the Trumbull plant of the Trumbull Steel Co. at Warren has been idle the past week, but the Liberty tin mills near Leavittsburg are still on the active list. At Girard, the A. M. Byers Co. is operating its puddling furnaces in part, though its Hattie furnace is still banked. The Falcon Steel Co. at Niles is maintaining operations close to normal.

As a consequence of the tie-up, second quarter delivery of sheets is possible only on orders taken months ago. Large tonnages have accumulated which will be delivered as rapidly as the railroad situation clears up. Practically the only product now obtainable is through jobbers. Stiffening in prices is probable in view of curtailed output, anticipated labor shortage, midsummer reductions because of heat and other operating difficulties.

Some semi-finished material is being rolled, but the output is readily consumed in finishing departments. One sale of 12,000 tons of open-hearth sheet bars is reported at $70.

Handful Cause Idleness of Many

In the Mahoning Valley 800 striking yardmen and switchmen were responsible for the temporary unemployment of 40,000 workers in the iron and steel plants. "A handful of men—to be exact the number of striking yard conductors and brakemen did not exceed 800 here—have tied up the whole industry of the Mahoning valley," states a railroad official. "The loss in wages alone amounts to millions of dollars, while the loss suffered by the steel companies and the railroads cannot be estimated. The roads and the industries have patiently awaited the return of the switching crews, thinking that common sense would prevail, but when it was seen that no reasoning could shake them, it was determined to end this impossible situation and show the strikers that their interference with the welfare of the whole community would no longer be tolerated. The thinking, conservative elements of our loyal railroaders are with us to the last man."

Recovering Slowly

UNIONTOWN, PA., April 26.—Recovery of the Connellsville coke region from the effects of the railroad strike is not a hasty one. Throughout last week troubles existed at Newell yards, while car placements and deliveries were only a fraction of normal because of the congestion which still exists in the terminal yards of the various railroad companies. It is estimated that output in the region during the week was but approximately 48 per cent of that of the week of April 10.

The relation between the elastic strengths of steel in tension, compression and shear, investigated by F. B. Seely, associate professor of theoretical and applied mechanics, and W. J. Putnam, associate of theoretical and applied mechanics, has been issued as bulletin No. 115 of the Engineering Experiment Station of the University of Illinois. The bulletin presents the results of experiments with six grades of steel, three carbon steels and three alloy steels: namely, soft, mild and medium carbon steel; and vanadium, nickel and chrome-nickel alloy steel. The elastic strength in tension, in compression and in shear is given for each of the six grades of steel. Copies of the bulletin may be obtained without charge by addressing C. R. Richards, director Engineering Experiment Station, University of Illinois, Urbana, Ill.

The Harrison Safety Boiler Works, which has been carried on for many years as a copartnership by Jos. S. Lovering Wharton, William S. Hallowell and John C. Jones, has been incorporated under the laws of Pennsylvania, as the H S B W-Cochrane Corporation, with the following officers and board of directors: Jos. S. Lovering Wharton, president; John C. Jones, vice-president and general manager; William S. Hallowell, secretary and treasurer; Horace E. Sibson, general sales manager; Axel B. Wallem, general works manager. The corporation takes over the entire business of the former firm.

R. Carnick and J. Carnick of Carnick Bros. Co., extensive dealers in scrap iron and steel at Youngstown, Ohio, have incorporated the Commercial Shearing & Stamping Co. with a capital of $100,000.

Welding Society Holds Annual Meeting

The annual meeting of the American Welding Society was held at the Engineering Societies Building, 29 West Thirty-ninth Street, New York, April 22. This was in reality the first annual meeting of the society as the meeting held March 28, 1919, was largely an organization meeting.

In his address at the morning session, Prof. Comfort Adams, retiring president of the society and chairman of the engineering division, National Research Council, pointed out the difficulties with which the society has had to contend; the financial obligations had been large and difficulty had been experienced in keeping the gas and electric interests together. The future outlook, however, he said, was very bright and there was every prospect of a large increase in membership. Because of the interest shown at the meetings in Philadelphia, it had been decided to open a Philadelphia section. Chicago was reported as ready to start a section, and the same was true of Cleveland. In Detroit, Mr. Adams said, there are large welding interests but as yet no start has been made towards organizing a section.

Announcement of the election of officers for the following year was made as follows: President, J. H. Deppeler, Metal & Thermit Corporation, New York; vice-president for two years, J. W. Owens, Norfolk Navy Yard; vice-president for one year, D. B. Rushmore, General Electric Co. Directors for three years: W. M. Beard, Linde Air Products Co., New York; A. M. Candy, Westinghouse Electric & Mfg. Co.; C. J. Holslag, Electric Arc Cutting & Welding Co., Newark, N. J.; W. J. Jones, consulting engineer, New York; C. A. McCune, Page Steel & Wire Co., New York; S. W. Miller, Rochester Welding Works; P. F. Willis, Henderson-Willis Welding & Cutting Co., St. Louis. It was moved by the society that Joan Brogden of David Lupton Sons, Philadelphia, be recommended to the directors to succeed M. H. Roberts, Air Reduction Co., New York, who had resigned as a director.

A program of work for the coming year was outlined by W. H. Paterson, chairman of the program committee, as follows:

1.—Develop a training course and publish circular covering it.

2.—Standardization of welding procedure.

3.—Society policy to investigate welding failures and publish data as to methods of eliminating such failures. To show how sound welds can and should be made.

4.—Committee should be formed to decide what tests welding wire should meet to be acceptable to the society. "By this we do not mean we should tell the manufacturer what to make but that we should say whether a wire submitted by him is suitable for certain purposes."

5.—Classify welding applications. (a) Approved strength welds, (b) approved non-strength welds, (c) approved experimental welds, (d) dynamic and static applications.

6.—Analyze and publish data on the industries that can use welding advantageously.

7.—The society should prepare and keep up to date a bibliography of articles on welding and allied subjects.

Matter of Accepting a Welded Joint

Welded joints for pressure vessels were scheduled for discussion at the afternoon meeting, but owing to the absence of a large number of the members who were serving on the research committee of the American Bureau of Welding in conference with a special committee of the boiler code committee of the American Society of Mechanical Engineers on matters of welding and the application to steam boilers and pressure vessels, the afternoon session was devoted to a general discussion of possible methods of testing welded joints. It was explained that at present there is no adequate acceptable method of knowing when a weld is good. Forge welding has a standing in court, and under a certain set of regulations, forge welding can be used. Before autogenous welding can secure the same standing, it will be necessary to devise means of making and inspecting welds which will be acceptable to the boiler code committee and the insurance companies.

Three papers were presented at the evening session. A paper on the "Speed of Metal Arc Welding" by William Spraragen, department of electric engineering, University of Washington, in the absence of the author was read by E. A. Miller, Metal & Thermit Corporation, New York. A digest of this paper will be given in a later issue. Automatic arc welding machines were discussed by H. L. Unland, power and mining engineering department, General Electric Co., Schenectady, N. Y. Lantern slides and motion pictures showed the machine in operation and samples of the work. The General Electric arc welding machine was described in THE IRON AGE, issue of March 11, page 734. Recent developments in gas cutting were set forth in a paper by Stuart Plumley, Davis-Bournonville Co., Jersey City.

Six Society Members of Engineering Council

The American Railway Engineering Association has accepted an invitation from United Engineering Society to become a member society of Engineering Council. The association has about 1650 members and its headquarters are at 431 South Dearborn Street, Chicago. The association has named as its representative upon Engineering Council its president, Harry R. Safford, who is a member of the American Society of Civil Engineers and Engineering Institute of Canada. He was recently appointed assistant to President Hale Holden, of the Chicago, Burlington & Quincy Railroad, the Colorado & Southern Railroad, the Fort Worth & Denver City Railroad, and the Wichita Valley Railroad. The societies now represented in Engineering Council have an aggregate membership of 45,000.

Progress in Shipbuilding

WASHINGTON, April 27.—Progress is shown in commercial shipbuilding in the United States by latest reports of the Bureau of Navigation of the Department of Commerce. At the present rate of progress it is expected that by the end of the fiscal year the shipyards will be in about the same position, as far as private construction is concerned, as in June, 1917, when the Government took over practically all shipbuilding.

On April 1 there were under construction or contract for private owners in American shipyards 321 vessels, totaling 1,252,096 gross tons. The increases of the past few months are shown by the fact that on Jan. 1 the number was 165, totaling 679,170 gross tons; on Feb. 1 it was 183, totaling 791,911 gross tons; March 1 the number was 247 of 947,193 gross tons.

Sale of Steel by the Navy

The following announcement has been made by the Navy Department, Washington:

The Secretary of the Navy, in view of the continuation of the shortage of manufacturers' steel, has authorized the sale of an additional 30,000 tons of steel held by the Navy. This is the second large quantity of steel which the Navy has put on sale recently, the first sale being held about six weeks ago. There are included in this sale most of the merchantable types of steel, including plates, sheets, rods, billets, angles, channels and I-beams. Bids will be received up to May 5, 1920, at Bureau of Supplies and Accounts, Navy Department, Washington, for this steel. A catalog may be obtained upon request showing the size, physical and chemical characteristics of every piece of steel offered.

The steamship Chickasaw City has sailed from Mobile, Ala., with a cargo of steel products for Rotterdam. Steel plates were the principal item. This marks the beginning of monthly sailings out of Mobile by the new ships of the United States Steel Corporation, being built at the Chickasaw, Mobile, yards.

Machinery Markets and News of the Works

SHIPMENTS HELD UP

Machine-Tool Plants Still Having Transportation Difficulties

Business Continues Fairly Good Considering the Handicaps

Many machine-tool plants are still unable to make satisfactory shipments, due to the demoralization of railroad transportation. It is stated that present indications are that in many instances deliveries of tools will be considerably behind the time specified when sales were made.

The markets have been somewhat quieter the past week, due no doubt to the railroad situation, but a fairly good business has been done considering this handicap. Some machine-tool builders are sold so far ahead that they are not anxious to take on more business in view of the uncertainty as to future manufacturing costs. At least two leading makers of milling machines have announced an advance of about 10 per cent.

The expansion of the General Electric Co. continues, it having recently acquired one of the shell-manufacturing plants of the Bartlett Hayward Co., Baltimore, Md., and some of the machine-tool equipment bought for the Bridgeport, Conn., plant has been diverted to Baltimore. Other tools will be bought for the latter plant, which will be got into production as quickly as possible.

The U. S. Roller Bearing Co., New York, has bought 20 or more machines for a plant at Manasquan, N. J. The Automatic Straight Airbrake Co. is buying tools from the office of George W. Goethals & Co., New York, for a plant at Eleventh Avenue and Twenty-sixth Street. The Mergenthaler Linotype Co., New York, is buying a list of tools.

New York

NEW YORK, April 27.

The past week has been somewhat quieter than preceding weeks, this being due largely, it is thought, to the demoralization of railroad transportation. Another factor is the long deliveries which many machine-tool builders are quoting. Many tool users prefer to buy second-hand tools, if possible, when deliveries on new tools cannot be obtained for several months. Some tool builders are sold so far ahead that they are not anxious to take on more business, except with an understanding that the price be that prevailing at time of shipment. In several instances quotations are being made subject to an advance. Some makers of milling machines have put up their prices about 10 per cent, this applying to at least two of the best-known makes.

The U. S. Roller Bearing Co., 30 Broad Street, New York, is one of the large buyers now in the market, it having purchased 20 or more tools for a plant at Manasquam, N. J. Another buyer is the Automatic Straight Airbrake Co., which will occupy a plant at Eleventh Avenue and Twenty-sixth Street, New York. Buying of a list of tools is being done from the office of George W. Goethals & Co., 40 Wall Street. Both new and used tools are being purchased. The Mergenthaler Linotype Co., New York, last week issued inquiries for a list of tools. Some of these have been bought in the past few days. The Simms Magneto Co., East Orange, N. J., and the Van Sicklen Speedometer Co., Newark, N. J., have continued buying.

The General Electric Co., Schenectady, N. Y., which has bought one of the shell plants of the Bartlett Hayward Co., Baltimore, Md., has ordered a number of machine tools, which were purchased for the Bridgeport, Conn., plant, shipped to Baltimore. Other tools will be bought for the new Baltimore plant, which will be placed in production as soon as possible.

Perin & Marshall, 2 Rector Street, New York, have bought several machine tools for the plant of the Tata Iron & Steel Co., in India. Extensive purchases of steel-making equipment are also being made.

Crane business is light with both manufacturers of overhead and locomotive cranes, but a majority are well filled with orders for the next few months. Most of the inquiries being issued are for cranes of small capacity. There is a continued shortage of small motors.

Among recent inquiries are: The Wright Wire Co., Worcester, Mass., a 10-ton, 44-ft. span overhead traveling crane; the Brooklyn Rapid Transit, 85 Clinton Street, Brooklyn, N. Y., a 7½-ton overhead traveling crane; the Harvey Co., Baltimore, a 5-ton, 57-ft. 6-in. span and a 10-ton, 58-ft. 6-in. span overhead traveling crane; the Southern Railway, Washington, D. C., a 10-ton 20-ft. span pillar crane; and the Ingersoll-Rand Co., Painted Post, N. Y., a 3-ton, 40-ft. span and a 5-ton, 50-ft. span overhead traveling crane.

Recent sales include: The West Virginia Metal Products Co., 14 Wall Street, New York, two 5-ton, 30-ft. span and one 10-ton, 80-ft. span overhead traveling cranes from the Niles-Bement-Pond Co.; the Miami Copper Co., 61 Broadway, New York, a 15-ton, 30-ft. span and a 25-ton, 30-ft. span overhead traveling crane from the Niles-Bement-Pond Co.; the Bethlehem Shipbuilding Co., South Bethlehem, Pa., two 20-ton locomotive cranes from the Browning Co., Cleveland.

The American Safety Razor Corporation, 303 Jay Street, Brooklyn, has awarded contract to the Turner Construction Co., 244 Madison Avenue, New York, for a one and five-story addition, 25 x 125 ft. and 75 x 140 ft. respectively. A one-story boiler plant will also be erected, 25 x 50 ft.

The Dale Brewster Machinery Co., Inc., 54 Lafayette Street, New York, has increased its capital stock from $50,000 to $87,500.

The initial structure to be erected at the plant of the Westinghouse Lamp Co., 165 Broadway, New York, in the Watsessing district, Bloomfield, N. J., will be 93 x 160 ft., and with equipment will cost close to $150,000. Another building of larger size will be constructed closely following to cost approximately $600,000.

The T. L. Transmission Corporation, New York, has been incorporated with a capital of $100,000 by V. C. Thorne, T. A. E. Lake and F. A. Klein, 25 Broad Street, to manufacture airplanes and parts, automobile parts, etc.

The General American Tank Car Corporation, 17 Battery Place, New York, with headquarters at Chicago, has increased its capital to an active amount of $12,000,000. It will build a one-story addition to its plant at East Chicago, Ind., 400 x 1000 ft., to cost in excess of $1,500,000. Max Epstein is president.

The Garford Motor Truck Co., 427 West Forty-second Street, New York, has completed plans and will soon call for bids for a new eight-story, reinforced-concrete building, 118 x 200 ft., at Bridge Plaza and South James Street, Long Island City, to cost about $1,000,000, with equipment. McAvoy, Smith & McAvoy, Bridge Plaza, Long Island City, are the architects.

Pitz & Weber, Inc., 21 Rose Street, New York, operating an iron and brass foundry, has increased its capital stock from $150,000 to $250,000.

The Peerless Surfacing Machine Co., Troy, N. Y., has been incorporated with a capital stock of $50,000 by P. A. Bridgman, L. S. Greenleaf and F. E. Gallagher to manufacture special machinery.

The J. Kroder & H. Ruhl Co., 108 Meeker Avenue, Brooklyn, manufacturer of metal curtain poles and other special-

ties, is completing arrangements for a new plant, 130 x 150 ft., on North Henry Street, to cost about $150,000. Richard Berger, 309 Broadway, New York, is the architect.

Emil Steinhorst & Sons, Utica, N. Y., have been incorporated with a capital stock of $75,000 by Emil, T. F., and F. C. Steinhorst to manufacture sheet metal products.

The National Chain Co., 30 East Forty-second Street, New York, with plant at College Point, L. I., has filed notice of reorganization with an active capital stock of $210,000.

The Daly Steel Products Corporation, New York, has been incorporated with a capital stock of $40,000 by H. M. Schaap and M. M. Goldschmidt, 299 Broadway, to manufacture steel and iron products.

The Republic Pipe & Iron Corporation, Brooklyn, has been incorporated with a capital stock of $25,000 by T. Didonna, M. Solomon and S. J. Cutler, 1804 Avenue K, to manufacture iron pipe and other products.

The White Motor Co., 280 Central Avenue, Albany, N. Y., has broken ground for a new machine shop and service building at North Broadway and Third Street, to cost about $50,000.

Carlton, Young & Catlin, Inc., New York, has been incorporated with a capital stock of $15,000 by H. Carlton, W. H. Young and G. L. Catlin, 1 Liberty Street, to manufacture iron and steel specialties.

The Strong Machinery & Supply Co., 21 Walker Street, New York, has increased its capital stock to $75,000.

The Hygrade Machine Products Mfg. Co., Brooklyn, has been incorporated with a capital stock of $30,000 by H. J. Schlesinger, F. H. Judith and A. Pisciotto, 146 Snedeker Avenue, to manufacture tools and machinery.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, has completed plans for a one-story power plant, 38 x 120 ft., on Grand Avenue, near Prospect Place, to cost about $40,000.

The Tucker Tool & Machine Co., 75 Murray Street, New York, has increased its capital stock to $60,000.

The Rainier Motor Corporation, 225 West Fifty-eighth Street, New York, manufacturer of passenger automobiles and trucks, has arranged for a preferred stock issue of $700,000. Plans are under way for an addition to the plant on Bayside Avenue, Flushing.

The Thresher Mfg. Co., Brooklyn, has been incorporated with a capital stock of $250,000 by G. C. Evans, W. K. and J. D. Smith, 25 Clermont Avenue, to manufacture electrical equipment and appliances.

The Trojan Accessories Co., Troy, N. Y., has been incorporated with a capital stock of $100,000 by C. A. Sleicher, J. E. Hutchins and F. H. Deal to manufacture automobile parts.

The Newtown Tire Co., Jackson Avenue, Long Island City, has had plans prepared for a one-story factory on Albion Street, Maspeth, L. I., 95 x 295 ft., to cost about $50,000.

The Embossing Co., 20 Church Street, Albany, N. Y., manufacturer of metal mechanical toys, is taking bids for an eight-story reinforced-concrete plant, 80 x 100 ft., at Broadway and Pruyn Street, to cost about $100,000.

The American Mirete Corporation, New York, has been incorporated with a capital of $125,000 by A. G. Kent, 106 West Fifty-second Street, and others to manufacture metal products.

Charles Cory & Son, 290 Hudson Street, New York, have been incorporated in Delaware with a capital stock of $1,850,000 to manufacture engine bells, nautical instruments, precision equipment, etc. A six-story plant, 140 x 175 ft., is being erected at King and Varick streets, to cost about $200,000.

The Overman Cushion Tire Co., 250 West Fifty-fourth Street, New York, manufacturer of automobile tires, has increased its capital stock from $250,000 to $550,000.

The Air Reduction Co., 120 Broadway, New York, manufacturer of oxy-acetylene cutting and welding equipment, has arranged for a bond issue of $2,000,000. It is now operating plants in 24 cities. A. S. Blagden is president.

The Northern Machine Corporation, Watertown, N. Y., recently incorporated with an active capital stock of $157,500, is planning for the purchase of equipment for the manufacture of paper mill machinery, hydraulic turbines, etc. W. D. Ogsbury, W. J. Young and F. K. Purcell head the company.

The Continental Radio & Electric Corporation, New York, has been incorporated with a capital stock of $30,000 by G. E. Burghard, J. F. Grinan and F. di Blasi, 6 Warren Street, to manufacture electric apparatus for wireless operations, etc.

The Wizard Novelty Mfg. Co., New York, has been incorporated with a capital stock of $200,000 by W. J. Jaeger, C. Rebholz and H. Schlesinger, 120 West 116th Street, to manufacture metal cooking and household utensils.

Hare's Motors, Inc., New York, recently organized as an operating company for the Mercer Automobile Co. the Locomobile Co. and the Simplex Automobile Co., has moved to permanent headquarters in the Locomobile Building, 16 West Sixty-first Street. Emlen S. Hare is president.

The Airtone Corporation, New York, has been incorporated with a capital stock of $300,000 by C. H. Day, M. J. Finkelstein and H. B. Mingle, 233 Broadway, to manufacture talking machines, parts, etc.

The Columbia Graphophone Mfg. Co., Woolworth Building, New York, has arranged an appropriation of about $4,600,000 for the establishment of its new plants at Orangeville, Baltimore and Toronto, Ont., references to which have been made.

The Hellman Motor Co., Long Island City, has acquired property at South Jane Street, Ely and Sunwick avenues, aggregating about 80,000 sq. ft., for a consideration of about $110,000. The site will be used for a service and repair building.

The National Seal Co., Portland, Me., manufacturer of metal seals for bottles, etc., has leased 94,400 sq. ft. in the Flatbush Industrial Corporation Building, Fourteenth Avenue and Thirty-sixth Street, Brooklyn, for branch works.

The Johnson Automatic Arms Co., Passaic, N. J., has been incorporated with a capital stock of $1,500,000 by James S. Johnson, Charles A. Powell and Edward T. Moore to manufacture firearms.

The Spicer Mfg. Co., South Plainfield, N. J., manufacturer of automobile parts, has acquired control of the Salisbury Wheel & Axle Co., Jamestown, N. Y. A short time ago the Spicer company acquired the Sheldon Axle & Spring Co., Wilkes-Barre, Pa., and the Parish Mfg. Co., Reading, Pa., with branch plant at Detroit, manufacturing a similar line of products.

The Pennsylvania Tubeless Tire Co., Brooklawn, N. J., has been incorporated with a capital stock of $250,000 under Delaware laws by Thomas C. and L. A. Watkins, Brooklawn; and F. H. Reeder, Alliance, Ohio, to manufacture automobile tires.

The American Marine Equipment Co., 1064 East Grand Street, Elizabeth, N. J., is having plans prepared for a one-story machine shop addition, 45 x 100 ft., to cost about $25,000.

The Hudson Machinery Corporation, New York, has been incorporated with a capital stock of $50,000 by G. F. Losche, A. P. Anderson and E. B. Hallett, 34 Nassau Street, to manufacture machinery and parts.

The B. & B. Machine Co., Albany, N. Y., has filed notice of dissolution.

The Safety Car Heating & Lighting Co., 206 Erie Street, Jersey City, N. J., manufacturer of electric lighting equipment and systems, has disposed of its local plant and property to the Erie Railroad Co. Early in the fall the company will vacate and plans to remove its works to New Haven, Conn. It has been operating at Jersey City for over 20 years and is now giving employment to about 500 men.

C. A. Lausberg & Sons, Inc., Haledon, N. J., has been incorporated with a capital stock of $100,000 by Carl A., William and Charles Lausberg to manufacture wire products.

The Ordnance Department, Picatinny Arsenal, Dover, N. J., is taking bids for four new shop buildings.

The Standard Collapsible Tube Co., Hoboken, N. J., has been incorporated with a capital stock of $100,000 by Herman J. Eckermann, Victor J. Tipula and C. F. Long to manufacture metal tubing.

The A. B. See Electric Elevator Co., Pacific Avenue, Jersey City, N. J., manufacturer of electric elevators, has filed plans for an addition to cost about $16,000.

In connection with its proposed new terminal in the Greenville section of Jersey City, N. J., the Central Railroad of New Jersey, 143 Liberty Street, New York, will build an electric power plant of about 4000 kw. capacity for general operating service. Construction was inaugurated on the initial unit April 21, consisting of a 3000-ft. wharf near the foot of Chapel Avenue; at the extreme end of this wharf an ore unloading plant will be built primarily for the use of the Bethlehem Steel Co. The unloading units will be constructed at the present time, to be duplicated later. An electric-operated gantry crane of 30-ton capacity, covering four tracks, will be erected on the shore end of the pier. A number of other electric traveling cranes will be installed, as well as freight hoisting and loading machinery. When completed the terminal will cover about 500 acres and will be eight times the size of the initial unit now being constructed.

The Union Chain Co., 164 Emmet Street, Newark, N. J.,

has been incorporated with a capital stock of $50,000 by Joseph W. Rosenbaum, Carl A. Fingler and Julius E. Flink, to manufacture chains for industrial purposes.

The Fairbanks Co., 90 Academy Street, Newark, N. J., manufacturer of scales, mechanical equipment, etc., has leased the former plant of the American Oil & Supply Co., 52-56 Lafayette Street, for a new establishment. It comprises a main five-story and basement building, with adjoining three-story and basement factory, machine shop and other structures, totaling in all about 49,000 sq. ft. Possession will be taken about June 1. Headquarters of the company are at 416 Broome Street, New York.

The Standard Steel Products Corporation, Newark, N. J., has been incorporated with a capital stock of $100,000 by Marshall D. Bouillion, John Silverman and Herman R. Rose, to manufacture small steel specialties.

The General Auto Electric Co., 257 Halsey Street, Newark, has been incorporated with a capital stock of $50,000 by William F. Henke, Daniel E. Lenthe and Frederick E. Druiss to manufacture electric specialties.

The Submarine Boat Co., Port Newark, Newark, now operated under private ownership, has inaugurated construction of small cargo-carrying all-steel barges. The first fleet to be built will be used for canal service between Buffalo and New York. They will be built similar to those of the large fabricated steel vessels built for the Government.

The Home Utilities Co., Newark, has been incorporated with a capital stock of $100,000 by W. H. Demarest, Newark; D. H. Cushwa, Caldwell, N. J.; and F. L. Walters, Chatham, N. J., to manufacture heating equipment.

The Kelsey Motor Co., 810 Broad Street, Newark, has been incorporated with a capital stock of $2,000,000 by Ernest E. Slade and Edward J. Churchill, Newark; and C. W. Kelsey, Short Hills, N. J., to manufacture light automobiles.

New England

BOSTON, April 26.

The Fiske Rubber Co., Chicopee Falls, Mass., manufacturer of automobile tires, has awarded contract to the Fred T. Ley Co., 19 West Forty-fourth Street, New York, for a three-story brick and reinforced concrete addition to cost about $150,000.

The Rhode Island Malleable Iron Co., Hillsgrove, R. I., has completed plans for a one-story addition to its foundry, 56 x 90 ft., to cost about $35,000.

The Cheney Bigelow Wire Works, Springfield, Mass., manufacturer of elevator enclosures, elevator cabs, railings, etc., has broken ground for a two-story brick addition, 195 x 270 ft., at Brightwood. A. J. Tucker is president.

Landers, Frary & Clark, New Britain, Conn., manufacturers of electric devices, aluminum products, etc., have awarded contract to the Torrington Building Co., Torrington, for the erection of a six-story reinforced concrete addition.

The New Haven Clock Co., Hamilton Street, New Haven, Conn., has awarded a contract to Thomas F. Conniff, 229 Potter Street, for a four-story addition, 40 x 40 ft., to cost $25,000. Walter Camp is president.

The Eastern Malleable Iron Co., Naugatuck, Conn., has taken bids for a one-story foundry on South Avenue, 80 x 180 ft., to cost about $45,000.

The Greist Mfg. Co., Westville, near New Haven, Conn., manufacturer of sewing machine attachments, has increased its capital stock to $350,000.

The American Chain Co., Connecticut Street, Bridgeport, Conn., is planning to purchase a number of machine tools, including presses, power hack saw, drop hammer, etc.

The Chapman Valve Co., Indian Orchard, Mass., manufacturer of heavy-duty valves, has commenced the erection of a one-story foundry addition, 160 x 200 ft., on Pine Street, to cost about $75,000.

The Bryant Electric Co., State Street, Bridgeport, Conn., manufacturer of electrical specialties, lamps, etc., is planning for the erection of a four-story building, 120 x 150 ft., on Organ Street, to cost $150,000.

The Kneeland Mfg. Co., Wethersfield, Conn., has been incorporated with a capital stock of $25,000 by E. V. W. Kneeland, Wethersfield; Henry Reuber, Jr., 176 Warrenton Avenue, Hartford, and T. G. Case, Granby, to manufacture gas and electric fixtures and other metal specialties.

The Russell & Erwin Co., New Britain, Conn., manufacturer of builders' hardware, is completing plans for an addition. P. Sellers, 207 Orange Street, New Haven, is the engineer.

The Whitaker Reed Co., 84 Austin Street, Worcester, Mass., manufacturer of belt hooks, loom reeds and other textile equipment, has completed plans for a one-story addition on Mayfield Street, to cost about $25,000.

The Waterbury Rolling Mills, Waterbury, Conn., has filed plans for a one-story addition on Aurora Street.

The Franklin Moore Co., Winsted, near Winchester, Conn., manufacturer of iron bolts, rivets, etc., has increased its capital stock to $135,000.

The New Haven Steel & Iron Co., 902 Chapel Street, New Haven, Conn., has completed plans for a one-story brick addition, 50 x 100 ft., on Mill River Street.

The Carlisle Cord Tire Co., 200 West Fifty-fourth Street, New York, manufacturer of automobile tires, has awarded contract to the Wells Construction Co., 237 Fifth Avenue, for its new plant at Stamford, Conn., comprising a one-story building, 60 x 315 ft., with one-story wing, 30 x 60 ft., to cost about $150,000.

Arnold & Co., Inc., Norwalk, Conn., manufacturer of iron castings, has broken ground for a one-story addition, 50 x 100 ft.

The Jewell Belting Co., East Hartford, Conn., has filed plans for the erection of an addition on Oakwood Avenue, to cost about $21,000. A new boiler plant will also be built.

The Hartford Iron Works, East Hartford, Conn., is considering the purchase of about 39 acres in Hartford and Wethersfield upon which a new plant will be erected. Its East Hartford Meadow plant was burned about a month ago. William A. Clinton is president.

Preliminary work has started for the construction of a manufacturing building by the Greyhound Motors Co., Warren, Mass.

The city of Hartford, Conn., has appropriated $125,000 for a machine shop for the fire department and has taken an option on John Street property.

The Linsky Construction Co., Bridgeport, Conn., is figuring on plans for a manufacturing building which call for a traveling crane.

The Board of Education, Seymour, Conn., will erect a school which will include a manual training department for which machine shop equipment will be purchased.

The Union Twist Drill Co., Athol, Mass., will soon award contract for the construction of a stock and hardening building, 49 x 161 ft., and a shop building, 63 x 174 ft., at its Butterfield branch, Derby Line, Vt.

A one-story Truscon steel type building, 60 x 120 ft., for the Spencer Turbine Co., Hartford, Conn., will be built in the near future. It contemplates the erection of a larger production building at a future date.

Philadelphia

PHILADELPHIA, April 26.

The Philadelphia Storage Battery Co., Ontario and C streets, Philadelphia, manufacturer of batteries, has awarded contract to the Stewart Brothers Co., 2526 North Orkney Street, for a two-story brick addition to cost about $40,000.

The Monarch Mfg. Works, Inc., 3129 Emery Street, Philadelphia, manufacturer of machine products, has completed plans for a one-story addition, 32 x 52 ft., at Westmoreland and Richmond streets.

The Carver File Co., 3231 Frankford Street, Philadelphia, has awarded a contract to the William Steele & Sons Co., Sixteenth and Arch streets, for a one-story, brick addition, 140 x 196 ft., on Tacony Street, to cost about $75,000.

Fire, April 17, destroyed part of the plant of the Philadelphia Roll & Machine Co., Twenty-third Street and Washington Avenue, Philadelphia, with loss estimated at about $150,000.

Frederick Shultz, Philadelphia, has filed plans for a two-story brick forge shop on Second Street, near Glenwood Avenue.

The H. Belfield Co., 435 North Broad Street, Philadelphia, manufacturer of steam supplies, fittings, etc., has filed plans for extensions and improvements to cost about $10,000.

The Navy Department, Washington, D. C., is arranging for additions and improvements at the League Island Navy Yard, Philadelphia, during the coming year. The estimated expenditures are placed at $17,268,360 and this amount has been incorporated in the naval bill as now written. Of this sum, $11,000,000 will be employed for construction and repair work; $2,500,000 for steam engineering service; $780,000 for ordnance, and $1,000,000 for supplies.

The Crescent Insulated Wire & Cable Co., Taylor Street, Trenton, N. J., has filed plans for a one-story addition on Ginder Alley, to cost about $50,000.

The Gearless Tractor Co., Atlantic City, N. J., has been

incorporated at $3,000,000 by Chester L. Maxwell, Frank McCaulley and Theodore Thompson, to manufacture motor-driven tractors, parts, etc.

The Evans Storage Battery Co., Camden, N. J., has been incorporated at $250,000 by Frank S. Muzzey, Joseph P. Murray and F. Stanley Saurman, to manufacture storage batteries.

The Darling Pump & Mfg. Co., Williamsport, Pa., manufacturer of pumps and valves, will build two two-story additions to its plant, 40 x 100 ft.

The Grohman Motor Mfg. Co., East Greenville, Pa., incorporated early in the year to manufacture four-cyclinder motors for auto trucks and tractors, is planning to start operations soon in its first building. The company has taken over the property formerly occupied by John S. Derr & Son. The initial plant will have a capacity of about six motors a day, and it is proposed to build an extension in the near future. The company will have castings made at the Reading Steel Casting Co., Reading, and the Freed Heater Co., Collegeville, Pa.

The Wood-Embly Brass Co., Rouzerville, near Waynesboro, Pa., is planning to rebuild the portion of its plant destroyed by fire, April 17, with loss estimated at $15,000. C. J. Huff is president, and D. E. Kauffman, secretary and treasurer.

The Harrison Safety Boiler Works, Seventeenth Street, near Allegheny Avenue, Philadelphia, will build a one-story foundry addition at Earnest Station, Norristown, Pa., 25 x 50 ft.

The Department of Public Works, Harrisburg, Pa., has completed plans for a one-story machine shop, with forge department, on South Ninth Street, to cost about $10,000.

The Eberley & Orris Mfg. Co., Allen Street, Mechanicsburg, Pa., manufacturer of automobile parts, etc., is contemplating extensions and improvements in its one-story plant to cost about $50,000. D. W. Sunday is president.

The Endure Porcelain Enameling Co., Middletown, Pa., has been organized by officials of the Wincroft Stove Works of this city, to make enamelware specialties. A building on Brown Street has been acquired and extensions and improvements will be made. It is planned to begin operations early in September.

The Smith & Furbush Machine Co., Philadelphia, has increased its capital stock from $400,000 to $500,000. Frank E. Schermerhour is treasurer.

The Clip Bar Mfg. Co., Philadelphia, has changed its name to the Shuster Engineering Corporation.

The Cornwall & Lebanon Railroad will erect new machine shops at West Lebanon, Pa., construction to start in a short time.

The Pennsylvania Equipment Co., 1420 Chestnut Street, Philadelphia, is in the market for a 500- to 750-hp. steam engine, 150 r.p.m., steam pressure 160 lb. A Corliss valve type cannot be used, due to the speed at which the engine will be operated. An engine of the slide valve type is preferred.

Buffalo

BUFFALO, April 26.

The new foundry of the American Radiator Co., 1809 Elmwood Avenue, Buffalo, plans for which have now been completed, will be one-story, 116 x 200 ft. It is estimated to cost about $50,000.

The Standard Foundry Co., 743 Hertel Avenue, Buffalo, specializing in the production of iron castings, has filed notice of reorganization, with an active capital stock of $198,000.

The Metal Goods Corporation, Buffalo, has been incorporated with an active capital stock of $43,000 by R. C. Taylor, G. G. Smith and F. A. Oger, to manufacture metal specialties.

The Iroquois Tool & Die Co., Buffalo, has filed notice of change of name to the Iroquois Tool & Stamping Corporation.

The Mulholland Co., 208 Washington Avenue, Dunkirk, N. Y., manufacturer of automobile parts, has increased its capital stock from $50,000 to $150,000.

The Ogdensburg Machine Co., Ogdensburg, N. Y., is planning for the erection of a one-story machine shop, 44 x 112 ft., to cost about $25,000. A site for the structure is being selected on Isabella Street.

The Buffalo General Electric Co., Electric Building, Buffalo, has increased its capital stock from $10,000,000 to $25,000,000 for extensions in power plants and system.

The Boggs Potato Grader Co., Atlanta, N. Y., manufacturer of agricultural implements, has filed notice of change of name to the Boggs Mfg. Co. The company recently increased its capital from $100,000 to $2,000,000.

The Climax Corporation, Batavia, N. Y., has been organized to take over the Warsaw-Wilkinson Co., manufacturer of agricultural implements, and the Batavia Machine Co., manufacturing a similar line of specialties, located at the former Bidwell plant on Swan Street. Officials of the former companies head the new organization and there will be no change in operation or management.

The Acme Tool & Die Co., 314 East Water Street, Syracuse, N. Y., has acquired a three-story building in the vicinity of its works for an addition.

The Lynch Safety Pneumatic Automatic Tire Corporation, Syracuse, has been incorporated with an active capital of $60,000 by J. B. Lynch, W. B. Shaul and H. E. Waite, to manufacture automobile tires.

The H. H. Franklin Mfg. Co., 302 South Geddes Street, Syracuse, N. Y., manufacturer of automobiles, has awarded a contract to Reidpath & Son, Builders' Exchange, Buffalo, for a seven-story addition, 200 x 320 ft., to cost about $900,000, including equipment. The company has arranged for a preferred stock issue totaling $1,000,000.

The Chemung Valley Steel Co., Elmira Heights, N. Y., has been incorporated with a capital of $250,000 by C. H. Topping, L. A. Anderson and A. W. Palmer, 27 Cedar Street, New York, to manufacture steel specialties.

The Ner-a-Car Corporation, Syracuse, N. Y., recently incorporated at $400,000 to manufacture automobiles, has increased its capital stock to $1,100,000. J. L. Horan, J. Benders and D. Scanlon head the company.

The H. A. Inman Co., Inc., Newark, N. Y., manufacturer of automatic paper box machinery, is planning for the erection of a one-story foundry, 60 x 60 ft., to cost about $15,000.

The DeGrasse Paper Co., Pyrites, N. Y., is having plans prepared for a one-story, steel and reinforced-concrete machine shop, 60 x 208 ft., to cost about $150,000, including equipment.

The Yawman & Erbe Mfg. Co., Rochester, N. Y., will erect a three-story factory in Campbell Street, to cost $244,000, for the manufacture of metal office furniture.

The Hoffman Machine Co., Syracuse, has prepared plans for a foundry on Fayette Street.

The R. E. Dietz Co., Syracuse, N. Y., has obtained permission for the construction of a four-story addition, 108 x 124 ft., to its factory on Wilkinson Street to cost $145,000. Dawson Brothers have the contract and work will start at once.

The Atmospheric Nitrogen Corporation, formed by interests in control of the Solvay Process Co., Syracuse, N. Y., and the General Chemical Co., has awarded contract to the J. G. White Co, for the erection of a plant at Willis Avenue and State Fair Boulevard to cost about $1,000,000. E. L. Pierce, president Solvay Process Co., is president of the Atmospheric Nitrogen Corporation.

The Daly Machine Co., Detroit, manufacturer of die sinking, milling and cherrying machines, has purchased the Batavia Steel Products plant, used for making shells during the war. It is intended to open an office in Batavia and to move its machinery there as soon as possible.

The Elmira Foundry Company, Elmira, N. Y., will erect a one-story building, 119 x 560, to cost $200,000.

The Medina Machine Company, Medina, N. Y., has increased its capital stock $25,000 which will be used for new equipment and improvements.

Baltimore

BALTIMORE, April 26.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has been granted permits for the construction of two additional buildings, 34 x 75 ft., at Westport, Baltimore, to cost $46,000.

The Republic Belting Co., Inc., 2133 West Pratt Street, Baltimore, has been incorporated with $200,000 capital stock to manufacture belting, etc. The incorporators are Harry J. Landback, Aubrey Pearre, Jr., and William L. Henderson.

The Backus Motor Co., 10 East North Avenue, Baltimore, has awarded a contract for the construction of an additional story, 94 x 72 ft., to its plant at North Avenue and Lovegrove Alley, to the Consolidated Engineering Co., Calvert Building. It will cost $10,000.

A permit for the construction of a one-story shop, 60 x 400 ft., to cost $67,000 has been granted to the Globe Shipbuilding & Dry Docks Co., which is building a plant at Fairfield, Baltimore.

The Simmons Co., 612 West Pratt Street, Baltimore, manufacturer of metal beds, has acquired 200 x 600 ft., on Fort Avenue near Porter Street, upon which will be built

an assembling plant and distributing station. Details for the building have not been announced.

The Down Town Service Co., 811 McKim Street, Baltimore, has been incorporated with $20,000 capital stock to carry on a general machine, motor vehicle and manufacturing business. The incorporators are Benjamin Goldberg, Herman Krieger and Oscar Naditch.

Bowers & Bartlett, Inc., Riverdale, Prince George's County, Md., has been incorporated with $200,000 capital stock by Claude C. Bowen, Harry O. Bartlett and Charles C. Eckloff, to manufacture washing machines, equipment and ironers.

The Baltimore Electric Supply Co., 309 North Calvert Street, Baltimore, has filed plans for the construction of a five-story brick manufacturing building and warehouse to cost $70,000.

The Raven Coal & Mining Co., Raven, Va., wants quotations on tipple equipment, etc. D. C. Yates is president.

Plans of the Westbrook Elevator Mfg. Co., Danville, Va., call for the construction of a two-story brick building, 60 x 180 ft., to cost about $50,000. New machinery, equipment, etc., will be installed.

The General Electric Co., Schenectady, N. Y., has acquired the former plant of the Bartlett Hayward Co., Columbia Avenue, Baltimore, recently offered for sale by the Government and used during the war primarily for the production of shrapnel shells. It consists of a number of one-story buildings extending 1100 ft. on Columbia Avenue and 1544 on Putnam Avenue, providing about 450,000 sq. ft. of floor space. It will be used for the manufacture of a special line of electrical equipment.

The Baltimore Electrical Supply Co., 309 North Calvert Street, Baltimore, manufacturer of electrical specialties, has filed plans for a new building at 331-5 North Calvert Street, to cost about $70,000. It will be 69 x 100 ft.

The Automatic Illuminated Advertising Corporation, 816 West North Avenue, Baltimore, has been incorporated with a capital stock of $200,000 by Lester G. Matthews, F. Allen White and Herman Norwood, to manufacture outdoor electric displays and automatic machinery for advertising purposes.

Trevor & Morris, Inc., Key West, Fla., recently organized with a capital stock of $35,000, is planning for the erection of a three-story machine and repair works, 50 x 145 ft., Benjamin D. Trevor is president.

The Victory Storage Battery Co., Maryland Casualty Building, Baltimore, has been incorporated with a capital of $10,000 by A. J. Thompson, Edward B. Masterton and Henry Stockbridge to manufacture batteries.

The Royal Metalware Mfg. Co., Denton, N. C., is preparing plans for the construction of a building, 100 x 150 ft., for the manufacture of aluminum kitchenware, etc. Prices are wanted on presses, dies, lathes, etc. J. L. Snyder is treasurer.

Quotations on machine shop equipment are desired by J. E. Bobbitt, Greensboro, N. C.

The J. F. Tice Co., LaGrange, Ga., recently incorporated with $25,000 capital stock, will install machinery for the manufacture of castings and desires prices.

The Red Diamond Motors Co., Atlanta National Bank Building Atlanta, Ga., has been organized and is contemplating the establishment of an assembling plant. Prices are wanted on machinery. W. H. Seabrook is president.

The Armstrong-Emley Crankless Engine Co., Jacksonville, Fla., has been organized with $2,500,000 capital stock to manufacture crankless stationary steam engines. F. H. Cooper is president and F. S. Tousey, secretary.

The Ornamental Foundry Co., Anniston, Ala., has been organized with $60,000 capital stock by C. A. Hamilton and others to manufacture metal posts.

Chicago

CHICAGO, April 26.

Business has slowed up materially as a result of the railroad strike. Stocks of raw materials are being rapidly depleted and users face an early curtailment of operation unless transportation improves. For the present, therefore, plans for expansion have been forced in the background. Uncertainty as to machine tool deliveries is also a factor. Although local dealers have been able to move some shipments out of the city—and in this respect they are better off than at the beginning of the strike—they are receiving little or nothing from manufacturers. At the same time considerable sums of money are tied up in machine tools in transit, making further accessions to their order books burdensome at this time.

As is usually the case in dull periods reports from individual sellers vary considerably. One large machinery house, in fact, has booked as much business thus far this month as during the corresponding period in March. This case, however, is an exception. While the market is generally slow, it is not without activity. The Griffin Wheel Co., which recently issued an inquiry for its new Council Bluffs plant, has bought about $30,000 worth of machine tools. A manufacturer of mining machinery has purchased a number of turret lathes and boring mills, amounting to about $15,000, and the Continental Motors Corporation has closed for a 12,000-lb. steam hammer for its Muskegon, Mich., plant. Other recent orders include a 10-ft. gate shear, two large milling machines, and three smaller steam hammers.

A large steel interest has an inquiry out for 13 engine lathes, three slotting machines, two radial drilling machines, 72-in. gear cutter, large boring mill and two large planers. The Steel & Tube Co. of America has practically closed for a 50-in. x 32-ft. engine lathe and in addition is in the market for a 20-in. and 30-in. lathe, steam hammer and a large wheel press.

The Iowa Machine Works, Clinton, Iowa, has increased its capital stock to $200,000.

The National Highway Crossing Co., Kansas City, Mo., will move to Burlington, Iowa, where it will build a plant. Until the factory is completed, its product, steel railroad crossing equipment, will be manufactured by the Murray Iron Works, Burlington.

A one-story manufacturing plant, 415 x 500 ft., Dickens Avenue and Menard Street, Chicago, is nearing completion and has been leased for 25 years to the Yellow Cab Co. and the Walden W. Shaw Livery Co. for the manufacture of automobile cabs and trucks. The plant will produce eight cabs and six to 10 trucks a day.

The Board of Education, Davenport, Iowa, has authorized the purchase of Government machine tools for the high school.

The Chicago Steel & Wire Co., 10257 Torrence Avenue, South Chicago, is having plans drawn for a foundry addition, 38 x 64 ft.

The Chicago Steel Wheel Co., 7332 Kimbark Avenue, Chicago, will be reorganized with $1,000,000 capital stock and will move its plant to Gary, Ind.

The Fort Dearborn Mfg. Co., Sterling, Ill., plans the erection of a foundry, 100 x 120 ft.

The Northwestern Barb Wire Co., Sterling, Ill., proposes to remodel its plant at a cost of $50,000.

The Aurora Foundry Co., 375 Spruce Street, Aurora, Ill., has commenced the erection of a machine shop, 48 x 100 ft., to cost $10,000.

The Rex Steel Stamping Co., Joliet, Ill., has been incorporated with $40,000 capital stock by Frank J. Magee, 1425 North Raynor Avenue; Harry S. Humphrey, The Maples; Edward R. Daly, West Park, and R. L. Watson, 705 Second Avenue.

The E. J. List Co., Havana, Ill., manufacturer of marine clutches, has acquired a tract between Market, Jefferson and Pear streets, where it will erect an addition.

The Hazlett Mfg. Co., Kearney, Neb., manufacturer of rakes and hand weeders, has taken over the Kuhn rebabbitting tool, for rebabbitting and boring gas engine connecting rod bearings, and the Kuhn lathe tool holder. A new plant, including a foundry and machine shop, is contemplated.

The Brackett Stripping Machine Co., 505 Quincy Street, Topeka, Kan., will enlarge its plant.

The Sowell Cushion Wheel Co. has let contract for the construction of a one-story plant at 717 Wabash Avenue, Chicago, to cost $35,000.

The Union Railroad Equipment Co., 332 South Michigan Avenue, Chicago, is taking bids for a one-story foundry at Hammond, Ind., 70 x 120 ft., to cost about $125,000. William B. Hall is president.

The McDonald Machine Co., 7600 Racine Avenue, Chicago, has broken ground for a one-story machine shop, 150 x 400 ft., to cost about $200,000, including equipment. W. J. McDonald is secretary.

The Mead-Morrison Mfg. Co., Chicago, manufacturer of coal-handling and hoisting machinery, has acquired property at Welland, Ont., for the establishment of branch works. The present building will be remodeled and improved.

Fire, April 14, destroyed a large portion of the car shops of the Kansas City Western Railway Co., Wolcott, Kan., with loss estimated in excess of $100,000.

The Monighan Machine Co., 2016 Carroll Avenue, Chicago, has filed plans for a one-story machine shop at 4606-28 North Walton Street, to cost about $80,000.

Cleveland

CLEVELAND, April, 26.

The Lima Foundry & Machine Co., Lima, Ohio, recently incorporated with a capital stock of $550,000, will build a plant for the manufacture of gray iron and brass castings. A. W. Wheatly is president, T. R. Dunlap, treasurer, and Alex McDonald, secretary.

The Chalmers Pump & Mfg. Co., Lima, Ohio, will erect a foundry, 50 x 200 ft., to replace one recently burned.

The Washington Metal Products Co., Washington Court House, Ohio, recently incorporated with a capital stock of $50,000, will engage in the manufacture of gray iron castings. P. S. Horton is president, J. D. Bonne, vice-president and general manager, and W. A. Lubbers, secretary and treasurer.

The Shelby Wire Co., Shelby, Ohio, is erecting two new buildings, 40 x 230 ft. and 40 x 170 ft., respectively for the manufacture of bale tie wire.

The United Engineer & Foundry Co., Canton, Ohio, will erect a machine shop, 90 x 140 ft.

The Columbiana Boiler Co., Columbiana, Ohio, will build an extension nearly doubling its present capacity. The company has increased its capital stock from $50,000 to $300,000.

The Peerless Drawn Steel Co., Canton, Ohio, has increased its capital stock $600,000 for expansion.

Contract for the additions to the Champion Engineering Co., Kenton, Ohio, totaling about $1,000,000, has been let to the Foundation Co., New York. The work will include two buildings, 60 x 200 ft., and 60 x 300 ft., a $60,000 hotel for employees and about 30 houses to cost $100,000. The present buildings will be improved.

Cincinnati

CINCINNATI, April 26.

Transportation conditions, resulting from the switchmen's strike, have affected the machine tool market to some extent. Orders continue to come in, however, in fairly good volume, mostly for one or two machines, but bookings are not as heavy as in the first two months of the year. Many manufacturers are still several weeks behind on deliveries and all available space is now being used to store tools they are unable to ship. While no large lists are before the trade, a local manufacturer the past week received an order from the Texas Pacific Railroad for a number of engine lathes for a shop recently destroyed by fire. The list issued called for 16 engine lathes. It is reported that the General Motors Corporation, which contemplates the erection of several plants and the purchase of equipment, has decided, in view of conditions in the building trades, particularly with regard to labor, to go ahead with the erection of one plant at a time. A list is said to be in preparation for the Beech Grove shops of the Big Four. The Chicago, Burlington & Quincy list is still being figured on and it is expected that purchases will be made within the next week or two.

Labor conditions in the machine tool industry are being watched with interest. The time for the acceptance of the men's demands for increased pay expired last Saturday, and despite the claim by union leaders that three or four of the larger shops have agreed to pay the new scale, manufacturers are holding firm in refusing the demands. An attempt was made to call a strike in the factory of a local manufacturer but only 125 men out of 800 went out. The employees of the Cincinnati Car Co. are reported to have voted for a strike on May 1 if their demands are not met by that time. A vote for a general strike of machinists will be taken next Saturday and Sunday and announcement of the result is expected to be made by Monday.

The Lodge & Shipley Machine Tool Co., Cincinnati, has increased its capitalization from $1,000,000 to $4,000,000. No extensions are intended, the increase in capital being merely to bring it to the point where it would represent the investment and earning capacity of the company.

The Jarecki Chemical Co., Cincinnati, is in the market for a second hand 20-ton locomotive crane, with 40 to 60 ft. boom.

The Efficiency Tool Co., Dayton, Ohio, has increased its capital stock from $10,000 to $15,000. The purchase of additional equipment for the manufacture of dies, jigs, etc., is contemplated.

The Seville Foundry & Machine Co., Seville, Ohio, has been incorporated with a capitalization of $50,000 by J. R. Minton, H. J. Freeman, C. V. Matteson, N. L. Williamson and J. C. Murray. Grey Iron castings will be manufactured.

The citizens of Troy, Ohio, will issue $200,000 in bonds for the construction and equipment of a new electric light plant.

The United Phonograph Corporation, Omaha, Neb., has purchased the plant of the Houghton Mfg. Co. at Marion, Ohio, which will be enlarged and additional equipment purchased to double the present output.

The Recording & Computing Machines Co., Dayton, Ohio, has increased its capitalization from $200,000 to $4,000,000 with a view to greatly enlarging the capacity of the plant, tentative plans for which have been drawn. W. I. Ohmer is president.

The addition to the plant of the Ohio State Stove Co., Columbus, Ohio, furnishing 25,000 ft. of additional floor space, has been completed and the machinery is now being installed. In addition to stoves, steel kitchen cabinets are manufactured. To take care of future extensions the company has purchased additional ground opposite its present factory. W. B. Thomas is president.

The A. C. Electrical Mfg. Co., Dayton, Ohio, has increased its capitalization from $100,000 to $600,000, primarily for financing the volume of business on hand and contemplated. It recently purchased the plant and equipment of the Dayton Electrical Mfg. Co. which it will continue to occupy for a time. Plans are now being prepared for a steel and concrete factory, the first unit to contain about 100,000 sq. ft. of floor space. K. R. Jacoby is the president.

The General Motors Corporation recently purchased property valued at over $450,000 in Dayton, including that of the Dayton Metal Products Co., L. G. Lehman & Sons, and the S. H. Rothenburg Tobacco Co., which it is now occupying.

The Akron Brass Mfg. Co., Wooster, Ohio, has awarded a contract to J. C. Smythe, Wooster, for a one-story machine shop and brass foundry, 40 x 185 ft., to cost with equipment about $150,000.

The Fremont Foundry Co., Fremont, Ohio,, has taken bids for a one-story addition, 60 x 220 ft., to cost about $100,000.

Fire, April 14, destroyed the machine shop, mechanical department and car barns of the Dayton & Troy Traction Co., Dayton, Ohio, at Tippecanoe City, Ohio, with loss estimated at $150,000.

The Steel products Engineering Co., East Street, Springfield, Ohio, has completed plans for a one-story machine shop, 60 x 150 ft., to cost about $50,000.

The MacLeod Co., 2225 Bogen Avenue, Cincinnati, manufacturer of forges, sand blast equipment, etc., has awarded contract to Eldering & Jacobs, Builders' Exchange, for a three-story addition, 72 x 90 ft. Walter MacLeod is president and treasurer.

The Wagner Repair Shop, Cincinnati, is having plans prepared by J. R. and R. W. Stewart, architects, 519 Main Street, for a two-story machine and repair shop, 50 x 90 ft., at Thirteenth and Hunt streets, to cost about $25,000.

The Atlas Brass Foundry Co., West Stewart Avenue, Columbus, Ohio, has completed plans for a one-story foundry to cost about $20,000.

Pittsburgh

PITTSBURGH, April 26.

Fire, April 19, destroyed a part of the plant of the Wayne Iron & Steel Works, Duquesne Way, Ninth and Tenth streets, Pittsburgh, with loss estimated at $200,000. The structures damaged included machine shop, millwright shop, portion of the rolling mill and other departments. The plant is operated by Brown & Co., Inc.

The General Equipment Co., Clarksburg, W. Va., has been organized to manufacture mechanical appliances. Wane B. Horner and John D. Owens head the company.

The Phelps Can Co., foot of Lawrence Street, Baltimore, Md., has closed negotiations with the Chamber of Commerce, Clarksburg, W. Va., for a site to be used for the construction of a branch plant. The company is now operating a plant at Weirton, W. Va.

The Harbison-Walker Refractories Co., Pittsburgh, is arranging for an increase in its capital stock from $27,600,000 to $36,000,000.

The Carbon Fuel Co., Charleston, W. Va., is planning for the construction of a steel tipple and the installation of a new conveyor system at its properties at Carbon, W. Va. The company recently increased its capital stock to $1,250,000. J. R. Thomas is president.

A new gas producer and machinery will be installed in the addition to be erected by the Central Glass Works, Wheeling, W. Va. Improvements will be made in the present plant. The work is estimated to cost about $100,000.

The Pittsburgh Knife & Forge Co., Ridge Avenue and Chateau streets, Pittsburgh, is planning for the early occupancy of its new plant at Coraopolis, Pa., now in course of erection. It will be one-story, and is estimated to cost close to $500,000, including equipment.

The Monongahela Valley Traction Co., Fairmont, W. Va., is perfecting plans for the construction of an addition to its power plant at Rivesville, W. Va., to double the present capacity. The work with new turbine and other operating equipment is estimated to cost about $700,000. George M. Alexander is president.

Detroit

DETROIT, April 26.

The Monroe Steel Castings Co., Monroe, Mich., has been acquired by Detroit capitalists and the capacity of the plant will be immediately enlarged and the capital stock increased to $300,000. Carl F. Clark, formerly general manager, is president and general manager of the reorganized company and Allen B. Van Eschen, formerly works manager of the Michigan Steel Castings Co., is treasurer and factory manager.

The Schoenborn & Cowles Mfg. Co. and the S. & C. Mfg. Co., Detroit, have been consolidated as the Machine Products Co. G. C. Schoenborn is president, Theodore F. Drews vice-president, and Charles P. Sieder secretary-treasurer. Screw machine products will be manufactured.

Ground has been broken for the branch plant in Battle Creek of the Clark Equipment Co., Buchanan, where an axle factory will be established. When equipped the cost is estimated at $500,000. Four units are planned, including a power plant and office building.

The drop forging business of the Benton Harbor Malleable Foundry Co., Benton Harbor, Mich., has been taken over by the Benton Harbor Forging Co., a new corporation. The two concerns will be closely allied and the forging business will be conducted through the office of the malleable foundry company.

The Commerce Motor Car Co., Detroit, will erect a branch factory in Guelph, Ont., work on which will start immediately. It will have an initial capacity of 6000 trucks a year. Officers of the Canadian company are W. R. Parker, president; E. M. Baker, vice-president; H. Westeby, secretary and treasurer, and Charles L. Granger, production manager.

The Michigan Metal Supply Co., Detroit, has made the following changes in its personnel: E. H. Welker becomes president, succeeding D. H. Creider, whose interests he has bought; A. M. Welker, vice-president, and M. Morgner, secretary and treasurer.

The Liberty Starter Co., Detroit, has begun operations in its third factory unit at Jefferson Avenue and Fifteenth Street. It now employs 1000 and the daily production has reached 2000 motors and generators.

F. A. Baird Co., Trenton, Mich., manufacturer of machinery, will immediately begin the erection of a factory on the old fair grounds.

The Grand Rapids Tire & Rubber Co., Grand Rapids, Mich., is making excavations for a two-story plant at Fuller Avenue and the Grand Trunk Railroad.

The Peck Iron & Steel Co., Kalamazoo, Mich., has increased its capital stock from $30,000 to $60,000.

The Marshall Furnace Co., Marshall, Mich., contemplates doubling its capital stock by increasing it $150,000. An addition to the plant is also contemplated.

The Smalley General Co., Inc., manufacturer of thread millers and surface condensers, Bay City., Mich., has increased its capital stock from $50,000 to $525,000, all of which is paid up, to take care of its growing business and increase its plant and other facilities.

The Swedish Crucible Steel Co., Butler Street, Hamtramck, Mich., is having revised plans prepared for the proposed four-story addition to its plant, 100 x 200 ft., to cost about $200,000.

The Jansen Mfg. Co., Fourteenth Avenue near Howard Street, Detroit, manufacturer of belting, is having plans prepared for a two-story addition, 75 x 100 ft., to cost about $50,000.

The Grand Rapids Tire & Rubber Co., Kelsey Building, Grand Rapids, Mich., manufacturer of automobile tires, is having plans prepared for a two- and three-story plant on Fuller Avenue, to cost about $300,000, including equipment.

The Blodgett Engineering & Tool Co., Kerr Building, Detroit, is arranging for the erection of a new four-story plant on Fourteenth Street. A. E. Harley, 435 Woodward Avenue, is the architect.

The Detroit Stoker Co., Detroit, recently increased its capital stock to $200,000, to take care of the expansion of business and the operation of an additional foundry in Toledo. The change will not necessitate the purchase of equipment as all of its requirements have been filled.

The McMullen Machinery Co., Grand Rapids, Mich., has formed a handling and conveying equipment department, with K. K. Hicks, engineer, which will specialize on electric and pneumatic cranes and hoists, overhead systems, chain and belt conveyors, gravity conveyors and construction machinery.

St. Louis

ST. LOUIS, April 26.

The Brecht Co., 1201 Cass Avenue, St. Louis, manufacturer of machinery, is taking bids for a two-story machine shop, 107 x 130 ft., to cost $50,000.

F. L. White, Philadelphia, Miss., is reported in the market for about $20,000 worth of brick and tile machinery.

The Croskell Gin Co., Ardmore, Okla., Lee Paschall and others interested, will equip a cotton gin requiring about $60,000 worth of machinery.

The Oklahoma City Terminal Elevator Co., Grain Exchange Building, will equip an elevator to cost about $1,250,000 and is in the market for clippers, cleaners, driers, elevating machinery and power equipment.

The Associated Producing & Refining Co., Mansfield, La., Malcolm Burns, president, Shreveport, La., will equip a 5000-bbl. refinery.

The Pirdun Burner Co., Tulsa, Okla., C. E. E. Thompson, L. Pirdun and others interested, will equip a plant to manufacture fuel burners and other metal products.

The Sun Light Carbon Co., Red Fork, Okla., P. T. Peters secretary, Lynch Building, Tulsa, Okla., will equip a plant for the manufacture of carbon and its products for use in electrical machinery, etc.

The Weish & Lesh plant of the Motor Wheel Corporation, W. C. Brock, Memphis, Tenn., in charge, will equip a wheel-making plant at Monroe, La.

The City Light & Water Works, Carthage, Mo., M. Lipscomb, superintendent, is in the market for a crude oil engine, Diesel type, of about 100 hp.

Louisville

LOUISVILLE, April 26.

The O. K. Stove & Range Co., Louisville, has been authorized to increase its capitalization from $2,000,000 to $3,000,000. It is understood that additions to the plant are contemplated in the near future.

The Vatter-Drew Engineering Co., Louisville, has been incorporated with a capital stock of $20,000 by Clifford C. Vatter, William F. Vatter and H. C. Drew.

The Birmingham Pipe & Fitting Co., Birmingham, Ala., recently incorporated, is arranging for the erection of a plant at Gate City, Ala., for the manufacture of cast iron soil pipe and fittings. The initial works will comprise a one-story foundry, 75 x 250 ft., and one-story machine shop, 80 x 175 ft. K. A. Conville is president and J. A. Beggs, general manager.

The Atlantic Compress Co., Montgomery, Ala., is planning to rebuild its cotton ginning plant recently destroyed by fire, with loss estimated at $100,000.

The Hardy Radiator & Motor Support Co., Little Rock, Ark., recently organized, is planning for the establishment of works for the manufacture of automobile radiators and other sheet metal products. S. R. Thomas is president and J. E. England, Jr., treasurer.

The De Ridder Light & Power Co., De Ridder, La., is planning for the installation of new electric equipment for increased capacity, including engine, generator and auxiliary apparatus. M. B. Morgan is treasurer.

The Southern Automobile Mfg. Co., 117 Linden Avenue, Memphis, Tenn., has completed plans for its new works to cost about $250,000 with equipment. The main building will be two stories, 100 x 350 ft., with extension, 100 x 200 ft. W. A. King is president and manager.

The Acme By-Products Coal Co., Fleming, Ky., is planning for the construction of a new steel tipple near Sergent.

Indianapolis

INDIANAPOLIS, April 26.

The International Machine Tool Co., Twenty-first Street and Belt Railroad, Indianapolis, has broken ground for a one-story addition, 25 x 100 ft.

The C. L. Sonen Co., Indianapolis, has been incorporated in Delaware with capital of $100,000 by Clayton L. Sonen, E. E. Dean, Indianapolis, and Ralph C. Hughes, Hagerstown, Ind., to manufacture machinery and parts.

The Columbian Enameling & Stamping Co., Terre Haute, Ind., has broken ground for a one-story addition, 155 x 240 ft., to cost about $100,000.

The Synthetic Rubber Products Co., Elkhart, Ind., has been incorporated in Delaware with capital of $3,000,000 by Ernest W. Lohrman and Alexander C. Sievers, both of Elkhart, to manufacture rubber specialties.

The Illinois Car & Mfg. Co., Clark Street, Hammond, Ind., is having plans prepared for a one and two-story plant to cost about $100,000.

The Richmond Air Compressor Co., Richmond, Ind., has completed plans for a one-story addition, 80 x 145 ft.

The Olin Sales Co., 511 North Meridan Street, Indianapolis, has completed plans for a three-story service and repair building, 60 x 200 ft., at 30-32 West Vermont Street, to cost about $100,000.

The American Steel Foundries, 332 South Michigan Avenue, Chicago, has broken ground for a one-story addition on North Hohman Street, Hammond, Ind., 40 x 210 ft., for the production of brake beams and kindred equipment. It will cost about $25,000.

The Hartford Foundry & Machine Co., Hartford City, Ind., has been organized by J. C. Miller, William F. Lange and L. P. Young.

At the annual meeting of the Haynes Automobile Co., Kokomo, Ind., a stock dividend of 60 per cent was declared and it was voted to build a malleable iron foundry to cost $250,000 and to have an output of 20 tons of metal a day. It will also build a plant to manufacture the Little Six Haynes automobile and a factory in which to manufacture the bodies.

Fire, April 15, caused damage to the amount of $20,000 to the forge room and foundry of the Vulcan Plow Co., Evansville, Ind.

The Universal Gauge Co., Anderson, Ind., has been incorporated with $75,000 capital stock to manufacture pressure gages. The directors are Charles R. Beck, Frank L. Beck and James W. Lee.

The George Cutter Mfg. Co., manufacturer of street lighting equipment, South Bend, Ind., has been sold to the Westinghouse Electric & Mfg. Co.

The Majestic Tire & Rubber Co., Indianapolis, has increased its capital stock from $250,000 to $1,000,000.

The Peter Healey Brass & Foundry Co., Evansville, Ind., has been incorporated with $50,000 capital stock to manufacture plumbers' supplies. The directors are Peter Healey, Frank Schwegeman and Henry B. Walker.

Milwaukee

MILWAUKEE, April 26.

Transportation difficulties are slowly being relieved and better deliveries to Michigan industries can be made, but the effects of the strike of union switchmen are still keenly felt in shipments to Eastern points. New England deliveries are subject to much delay.

New business continues in large volume, although requirements are for single tools or small lots. The tractor industry is one of the most active buyers and a leading interest is inquiring for a large lot of milling machines. Higher prices, effective April 15, and amounting to 10 per cent., have accentuated rather than retarded the demand, as further increases are in prospect.

Structural fabricators are sold up far ahead and new business is being declined so that shops may catch up. One leading interest is out of the market until Oct. 1. Jobs actually are going begging.

The Standard Steel Corporation, Milwaukee, has increased its capital stock from $200,000 to $600,000. A new plant is being completed at 1251 Thirtieth Street for making concrete mixers and a general line of farm equipment, metal specialties, etc. E. J. DeGuenther is president and treasurer.

George A. Steinle, principal owner of the Steinle Turret Machine Co., Madison, Wis., has purchased from the Government the brick and steel shop building, containing 75,000 sq. ft., which was erected for the use of the Four Lakes Ordnance Co., organized during the war by Mr. Steinle to manufacture 6-in. guns. The shop adjoins the Steinle works and has been idle for nearly a year. While no announcement has been made, it is believed that it will be re-equipped as a machine shop for the Steinle company.

The Milwaukee Stamping Co., Milwaukee, has increased its capital stock from $250,000 to $500,000 to accommodate the expansion of its business and production. An addition was erected last year and further extensions are contemplated. The plant is located at Sixty-fourth and Pullen avenues, in West Allis, and manufactures metal stampings, hardware specialties, etc. August J. Petrie is president.

The Twin City Machine & Welding Co., Neenah, Wis., has been organized by W. F. Casperson and S. J. Robbins and is establishing a general machine and repair shop at 124 North Commercial Street.

The Milwaukee Tool & Forge Co., 220 Becher Street, Milwaukee, has increased its capital stock from $15,000 to $25,000. It is increasing its capacity steadily and buying new equipment from time to time. George Haubert is president.

The H. A. Poppert Mfg. Co., 505 Cedar Street, Milwaukee, manufacturer of metal and wood patterns, will build a new shop on Third Street, between Poplar and Vliet streets, costing about $12,000.

The Waukesha Malleable Iron Co., Waukesha, Wis., has amended its corporate articles to increase the capital stock from $100,000 to $500,000. The foundry has undergone enlargement in the last six months and additional buildings are projected.

The Wohlrab Gear Co., Racine, Wis., manufacturer of gears and pinions, has purchased the plant of the Schartow Mfg. Co., 1226 Frederick Street, Racine, which is moving its hardware specialty works to South Milwaukee, Wis. The Wohlrab company will make alterations and intends to add considerable tool and other equipment to effect an increase of about 200 per cent in its production of automotive specialties and parts.

The Oneida Motor Truck Co. of Green Bay, Wis., a Wisconsin corporation with $600,000 capital, will reincorporate in Delaware with an authorized capitalization of $7,500,000, consisting of 50,000 shares of preferred at $100 per share and 50,000 shares of common without par value, representing $2,500,000. At the annual meeting on April 20, it was voted to issue $1,000,000 of new capital immediately to effect an increase in production from 130 trucks per month to 200. Unfilled orders April 1 numbered 700 trucks. A second unit of the factory is now under construction and will increase the aggregate floor space to 200,000 sq. ft. Additional machine tool and other equipment is being purchased from time to time. Lafayette Markle, president, and other officers and directors were re-elected.

The North Milwaukee Foundry Co., North Milwaukee, Wis., expects to be ready to start production at the rate of 10 to 15 tons of gray iron and semi-steel castings a day by May 10. It recently was incorporated with a capital stock of $40,000. Officers have been elected as follows: President, Joseph Ewens, formerly president Hercules Steel Castings Co., Milwaukee; vice-president, M. N. Federspiel; secretary-treasurer, C. G. Johnson; general superintendent, Herman Dehn.

The Magnetic Motors Corporation, 430 Jefferson Street, Milwaukee, has plans by A. C. Eschweiler, architect, 141 Wisconsin Street, for a two-story brick and concrete sales and service building, 100 x 110 ft., on Jefferson, near Biddle Street. It will cost about $75,000. S. N. Cotterman is president.

The Board of Education, Chippewa Falls, Wis., is taking sealed bids until 6 p. m., May 17, for the erection of a vocational training institute, designed by Beers, Schlintz & Bailey, architects, Monadnock Block, Chicago. It will cost about $200,000. P. T. Favell is secretary of the board.

The Evinrude Motor Co., 279 Walker Street, Milwaukee, which has broken ground for the first unit, containing 60,000 sq. ft., of a new manufacturing group at Twenty-seventh and Lake streets, expects to transfer its operation about Nov. 1. Its present four-story factory, 100 x 140 ft., has been sold to the Western Worsted Mills, 3033 Galena Street.

The American Axle Co., Chicago, manufacturer of worm-drive rear axles for motor vehicles, has awarded the general contract to the Austin Co., Chicago, for a brick and steel machine shop, 100 x 600 ft., at Barton, Washington County, Wis. It will cost about $100,000, including equipment. Peter C. Wolf Barton is in charge.

The Universal Motor Co., Oshkosh, Wis., manufacturer of gas engines and self-contained electro-generating units for farms and other isolated installations has purchased a site, 300 ft. sq., at Fifteenth and South Main streets, for a new machine shop to supplant the present plant on Ceape

Street. The floor space will be increased from 12,000 to 90,000 sq. ft. by the erection of new buildings. The Universal Foundry Co., which is related to the Universal Motor Co., is building an addition providing for a second cupola and more molding floor space.

The Woodford Engineering Co., Young America, Washington County, Wis., has broken ground for a two-story brick and concrete machine shop addition, 44 x 120 ft. Some new equipment is being purchased.

The Harley-Davidson Motor Co., Milwaukee, will erect a new transformer building, 30 x 55 ft., costing about $35,000 with equipment. A six-story extension is nearing completion and new equipment is being purchased. When the addition is ready for occupancy, the present No. 5 factory at Clinton and Oregon streets will be moved to the main works at Thirty-eighth and Chestnut streets. The Clinton Street shop, which is owned by the Alonzo Pawling estate, is being offered for sale or rent.

The Snap-On Wrench Co., Milwaukee, a new $25,000 corporation formed to manufacture mechanics' tools, has leased space at 134 Reed Street and is installing equipment.

The American Skein & Foundry Co., Racine, Wis., will break ground May 1 for a one-story brick, steel and concrete addition, 96 x 150 ft. The general contractors are Nelson & Co., local.

The University of Wisconsin, Madison, is taking sealed bids until 3 p. m., May 18, for the erection of a brick and concrete shop building, 106 x 182 ft., one story and part basement, for the use of the college of engineering. H. J. Thorkelson is business manager.

The Racine Accessories Mfg. Co., Racine, Wis., manufacturer of automotive specialties, has increased its capital stock from $20,000 to $30,000 and plans to increase its production.

The Wentink Mfg. Co., Menasha, Wis., a new $100,000 corporation which is breaking ground for a new machine shop, costing about $75,000, is a reorganization of the William Wenzel Co., and has absorbed also the American Appliance Co., manufacturer of car movers. It will manufacture a general line of patented mechanical specialties and appliances. Frank C. Wentink, Appleton, Wis., is president.

Texas

AUSTIN, April 24.

The Mack Mfg. Co., Ltd., manufacturer of oil and water well supplies, Houston, which is building a steel foundry, 74 x 200 ft., will add a 54 in. cupola for gray iron. It is also contemplating the installation of a number of heavy turret lathes and special equipment to its machine shops and a forging machine to its forge shops. Orders have been placed for $45,000 worth of equipment for the foundry and $150,000 will be expended for shop equipment within the next 90 days.

The Eastern Texas Electric Co., Beaumont, has increased its capital stock from $2,850,000 to $4,850,000 and plans extensive improvements to its properties.

The Kooken Pressed Brick Co., Ferris, has been incorporated with a capital stock of $85,000 and will build a plant. The incorporators are J. A. Smith, C. E. Kooken and J. M. Batchler.

The Alamo Refining Co., Eastland, will build an oil refinery at Necessity with a capacity of 1000 bbl.

The proposed new plant of the Transcontinental Oil Co., Hodge, will comprise a series of four brick and concrete buildings, to cost about $1,500,000, including equipment, and will be used for the production of lubricating oil, etc. O. H. Berryman is superintendent of construction.

The Sunlite Co., McKinney, Tex., manufacturer of automobile lamps, lenses, etc., is having plans prepared for a new one-story plant to cost about $100,000 including equipment. E. R. Brackett is engineer.

The Hibbs Rubber Co., Fort Worth, manufacturer of automobile tires, has awarded a contract to the B. M. & C. F. Davis Co., for the first unit of its proposed new plant, a three-story building, 220 x 275 ft., of brick and concrete. It will develop a daily capacity of about 200 tires and is estimated to cost $85,000.

The Hydraulic Machinery Mfg. Co., Port Neches, Tex., recently incorporated with a capital stock of $250,000, is arranging for the erection of three one-story buildings, each 60 x 140 ft., to be equipped as a foundry, machine shop and for sheet-metal and iron-working, respectively. The estimated cost is $75,000. Clayton F. Holmes is manager.

The General Motoors Corporation, Dallas, Tex., is having plans prepared for a six-story service and works building at Jackson and Jefferson streets, 100 x 100 ft., to cost about $150,000.

The Standard Spring & Axle Co., Dallas, Tex., has been incorporated with a capital of $25,000 by L. K. Weaver, and T. P. Steger to manufacture automobile axles, springs and other steel products.

The Dallas Railway, Interurban Building, Dallas, is planning for the erection of a new electric power plant, to cost, with transmission system, in excess of $1,000,000.

California

LOS ANGELES, April 19.

Don Lee, 1601 Van Ness Avenue, San Francisco, operating a motor agency, will build a two-story service and repair building at Van Ness and O'Farrel streets, 120 x 200 ft. One floor will be used for machine and repair work. The structure will be ready for occupancy in September.

J. T. Fleck, Chico, Cal., has leased a building on Park Avenue and contemplates the immediate establishment of a plant for the manufacture of automobile radiators, bodies and other sheet metal products.

The International Oil & Transport Co., Los Angeles, capitalized at $35,000,000, has acquired the plant of the Hercules Powder Co., Chula Vista, Cal., which it will remodel for a refinery. New machinery will be installed to cost in excess of $300,000. A. M. White is president.

The Federal Rubber Co., 1239 Van Ness Avenue, San Francisco, is having plans prepared for a new four-story reinforced concrete works on West Second Street, near Federal Street, to cost about $125,000. The engineering work on the project will be handled by the architectural department, company headquarters, Cudahy, Wis.

The Hercules Foundry Co., Los Angeles, has acquired the plant of the Schultheiss Mfg. Co., Slauson and Boyle avenues, which it will operate for the production of iron and steel castings, etc. The Schultheiss company is arranging to break ground at once for its new metal-working plant at Slauson Avenue and Bickett Street, where a two-acre site has been acquired. A number of buildings will be erected, with the main plant, 50 x 225 ft. I. H. Seeborn, 328 Clay Street, is the architect.

The Sunset Aircraft Corporation, Venice, near Los Angeles, has been incorporated with a capital stock of $100,000 by E. L. Remelin, F. W. and A. T. Carter, to manufacture airplanes and parts.

Charles E. Welch, Realty Board Building, Los Angeles, has filed plans for the erection of a one-story, brick machine shop, 45 x 108 ft., at 1626 South Los Angeles Street, to cost about $12,000.

The W. I. Elliott Co., Sacramento, Cal., is having plans prepared for the erection of an automobile service building and repair works at Sixteenth and J streets, to cost about $75,000.

The California Boat Building Co., Wilmington, Los Angeles, will erect a new machine shop, 30 x 30 ft., near the West Basin, San Pedro.

J. Greenberg and C. C. Seibert, Van Nuys, near Los Angeles, will build a new machine shop at 6262 Sherman Way, 30 x 50 ft.

The Pacific Northwest

SEATTLE, April 19.

A marked activity in manufacturing industries is noted and orders for railroad equipment and repairs are increasing. Deliveries have been seriously hampered by the switchmen's strike, which has not reached Seattle, although Portland has been partially tied up. The car situation is easier, although the month of April has shown fewer cars in proportion to the demand than during March. The call for sawmill machinery and canning supplies is unprecedented.

O. M. Forkel, Omak, Wash., plans the erection of a sawmill with a daily capacity of 30,000 ft. The major part of its output will be made into boxes.

Swarts & Washburne, Springfield, Ore., will establish a meat-packing plant in that city. Work will start immediately.

The U. S. Macaroni Co., Spokane, contemplates the erection of a new plant and will install $10,000 worth of new machinery.

The Smith Lumber Co., Olympia, Wash., contemplates moving its sawmill to Port Angeles, where a larger plant will be established and new equipment installed.

The Skinner & Eddy Shipbuilding Co., Seattle, has received contract for a 13,500-ton oil tanker for Norwegian interests which will require 10 months to build. A 2600-hp. engine will be installed.

The Northwest Steel Co., Portland, has sold its shipbuilding plant to the Northwest Bridge & Iron Co., a new organization. Contracts recently awarded to the Nortwest Steel Co. for seven 12,000-ton steel tankers by the U. S. Shipping Board were also taken over.

David Rodgers, Seattle, has closed contracts for 10 10,000-ton steel tankers for the American Fuel Oil & Transportation Co., New York. It is also reported that a contract for 10 additional steel steamships has also been taken. The Rodgers Shipbuilding Co. has been formed and yard No. 2 of the Skinner & Eddy plant has been taken over. It will employ about 6000 men and construction on the ships will start in about 60 days.

The Oregon Foundry Co., Portland,, has been incorporated for $15,000 by H. E. Harris, Milton B. Henderson, and others. A foundry and machine shop will be established.

The Griffin Wheel Works, South Tacoma, Wash., will increase the capacity of its plant about 50 per cent. An extension, 52 x 100 ft., will be built and additional equipment will be installed in every department.

The Oregon Pulp & Paper Co., Salem, Ore., plans the erection of a power plant with a capacity of 3700-hp. to cost $50,000.

The Olympia Door Co., Olympia, Wash., will erect a new sawmill with a daily capacity of 100,000 ft.

The Wise, Flanders & Grandy Mfg. Co., Spokane, manufacturer of dies and light tools, will install additional equipment at a cost of $5000, including punch press, turret lathe and automatic gear cutter.

J. B. Howell, Astoria, Ore., plans the erection of a meat-packing plant, to cost about $60,000, and to compose several units. The main building will be 50 x 72 ft. and a second unit 25 x 36 ft.

J. N. Young, 1416 Standard Building, Vancouver, B. C., is offering for sale the entire works of the Coquitlam Shipyards. In addition to the shipbuilding plant are a sawmill and wood-working shop and a complete line of pneumatic tools.

Canada

TORONTO, April 26.

The Canadian Tygard Engine Co., Ltd., Lawler Avenue, Toronto, has started excavation work for a two-story addition to cost $30,000. It will be used for the manufacture of airplane engines, rotary steam engines and fuel-mixing vibrative carburetors and is expected to be in operation by July.

The Galt Brass Co., Galt, Ont., has started work on two additions to cost approximately $50,000. The foundry will be 60 x 140 ft. and the vitro plant 40 x 50 ft.

The Canadian Laundry Machine Co., 47 Sterling Road, Toronto, has taken out a permit for the erection of an addition to cost $26,000.

The I. T. S. Rubber Co., 32 Alphine Avenue, Toronto, will erect an addition to cost $16,000.

The Oakville Basket & Veneer Co., Oakville, Ont., is in the market for a 125-hp. boiler, one 100-hp. boiler, one 100-hp. engine, slow speed; one hot water pump, also a time clock.

Matthews & Slade, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Ziba Gallagher, room 9, 18 Toronto Street; William T. Matthews, Frederick W. Slade and others to manufacture dies, tools, jigs, hardware specialties, etc.

The British & American Motors, Ltd., Toronto, has been incorporated with a capital stock of $300,000 by George E. McCann, 49 Wellington Street East; Francis A. Hammons, James O. Buckley and others to manufacture automobiles, motors, engines, tools, etc.

The Ontario Foundry Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Peter Kirkegaard, 33 Indian Road; Wilfred W. Parry, Horace B. Proudlove and others.

The Bannon Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Frederick W. Thorold, 167 Avenue Road; John Bannon, Frederick A. Roberts and others to manufacture machinery, tools, castings, etc.

The Crown Electric Mfg. Co., Ltd., 17 Pearl Street, Brantford, Ont., is building an addition to cost $14,000 and will install new equipment.

The Hydro Electric Power Commission of Ontario, University Avenue, Toronto, proposes to erect a plant at London, Ont., for the manufacture of electrical equipment, etc.

The Dominion Government Harbor Commissioners are erecting a cold storage plant and power house at the foot of Beaudry Street, Harbor Front, Montreal. Bids will be called shortly for electrical apparatus.

R. S. Kelsch, Power Building, Montreal, is in the market for a new or second-hand slip ring or synchronous motor, capacity 350 to 400 hp., 2200 volt, 60 cycle, three phase; speed 450 to 514 r.p.m. and to have three bearings suitable to take 44-in. face pulley.

The Atlas Mfg. Co., 234 Cameron Street, Port Arthur, Ont., has completed arrangements for the purchase of a building on Ambrose Street which will be remodeled and the ground floor used for a machine shop and manufacturing purposes. The company will turn out electrical goods including table lamps, electric call systems, etc.

The Eugene F. Phillips Electrical Works, Ltd., Montreal, is building an addition to its plant for the manufacture of enameled wire, in addition to its present products of wire, cable, etc.

Government Purchases

WASHINGTON, April 26.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, schedule 5983, for installing and furnishing deck elevator and traveling cranes for Norfolk, opening May 7; schedule 5988, 1 electric hoist for Norfolk, opening April 30; schedule 6001, 1 motor driven planer for Washington, opening May 11; schedule 6004, 1 measuring, reeling and wire cutting machine for Brooklyn, opening May 11.

OFFICE CHANGES

Alley & Page, pig iron, coke, coal and metals, will move their New York office to 261 Broadway, opposite City Hall, May 1. Their new telephones will be Barclay 618 and 619.

In order to co-operate fully with the shipping interests of the Atlantic Coast, the Westinghouse Electric & Mfg. Co., East Pittsburgh, has established a division of its marine department at 165 Broadway, New York, in charge of Frank F. Boyd and Norris R. Sibley.

The Eastern Engineering & Construction Co. has changed its home office from Derby to Bridgeport, Conn.

Charles B. Foster & Co., Worcester, Mass., machinists and tractors, has moved from 14 Coburn Avenue to 116 Exchange Street, where the entire building formerly occupied by the L. W. Pond Machine Co. has been leased.

The Leland-Gifford Co., Worcester, Mass., machine tools and drilling equipment, on May 1, will move its New York office from 418 to 2609 Singer Building. W. F. Henly is the New York representative.

The Otis Steel Co., Cleveland, has opened a sales office at 705 Kresge Building, Detroit, under the management of W. B. Johnson, who was formerly connected with the company's sales organization in Cleveland.

The George T. Ladd Co., Pittsburgh, manufacturer of the Ladd water tube boiler, announces the opening of a Chicago district sales office in charge of W. M. McKinstry, the address being 528 McCormick Building. Mr. McKinstry was formerly Chicago manager of the Page Boiler Co.

The Black & Decker Mfg. Co., Baltimore, has opened a northeastern branch office at 169 Massachusetts Avenue, Boston. D. G. Caywood, northeastern district manager, will have headquarters at this office.

The Chicago Pneumatic Tool Co. has removed its general offices from Chicago to New York, where it occupies its new 10-story building at 6 East Forty-fourth Street. The Chicago district sales branch, formerly in the Fisher Building, has been removed to 300 North Michigan Boulevard, and the Chicago service branch, formerly at 521 South Dearborn Street has been consolidated with the sales branch.

The Morrison & Risman Co., jobber in railway track equipment, with general offices and yards at Buffalo, has opened district sales offices in Pittsburgh, 703 Farmers' Bank Building. H. L. Morrison is in charge.

Alfred Herbert, Ltd., machine tools, 54 Dey Street, New York, has opened an office in Toronto, Canada, in the Board of Trade Building, 31 Yonge Street. J. C. Blair is in charge, assisted by G. A. Keith.

The Merchant Machine & Tool Co., Detroit, now has a Cleveland office at 511 Schofield Building, in charge of L. W. Arnold; and a New York office at 99 Warren Street, in charge of Charles M. Neth.

The Wagner Electric Mfg. Co., St. Louis, announces the removal of its Pittsburgh office to 530-534 Fernando Street, to continue in charge of Ludwig Hommel.

BOOK REVIEWS

Structural Drafting. By Carlton T. Bishop. Pages 352; 10½ x 7¾ in.; numerous figures, tables and diagrams. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York.

The requirements of engineering draftsmen, apprentices and engineering students are comprehensively covered in this work. Special emphasis is laid on the principles and methods of good practice in structural drafting, with careful consideration of representation, of billing, and of dimensioning. Drawings of common types of members, according to the fundamentals laid down, are fully illustrated. The elements of design, particularly of simple members and of details, are shown; but the design of special members and complete structures is omitted as in the field already covered in other treatises.

The book is planned for convenient reference. The tables are intended to supplant the structural steel company handbooks in some student courses and are arranged to reduce largely the turning of pages back and forth. Weights and areas of all angles are grouped with the gages of the angles and the areas of holes. To facilitate finding any figure it is given the same number as the page it is on. Simplicity is sought by reducing the number of formulas to a minimum and standardizing their notation as much as possible.

Graphic Production Control. By C. E. Knoeppel. Pages xxiii + 477, 6 x 9 in.; numerous illustrations. Published by The Engineering Magazine Co., New York.

The title of this book is so concise as to be almost misleading. The real object of the book is to set forth various methods of graphically portraying statistics pertaining to production of any kind and to some extent to recommend methods for the collection of these statistics. To quote from the author's preface it is his slogan to "let lines replace figures." And it would seem that this slogan is worthy the attention of manufacturing executives.

The subject matter presented has been grouped into five main divisions. First, the philosophic aspect of graphic production control, in which various well known applications of graphic control are described to illustrate the practicability of graphics. Second, the preliminary steps in graphic production control in which recommendations are made as to laying of a foundation for a definite program for introducing graphic control. This division is rather short as the entire book presumes considerable knowledge of management on the part of the reader. Third, installation of graphic production control, which comprises more than half the book, treats in detail with the various major functions of a productive organization, giving illustrations of typical personnel charts, shop system forms, and graphic analysis charts. Fourth, the managerial features of graphic production control, in which sample charts of graphic analysis for the use of busy executives are given. Fifth, the conclusion, consists of two chapters briefly discussing the pitfalls of graphic presentations and the economic aspects of graphic production control.

Throughout, the book is profusely illustrated, the various charts, forms and illustrations being taken from many and varied lines of industry, with a view to giving the reader as many aspects as possible of the subject with which the author deals. E. C. R.

Mechanical World Year Book. Pages 645, 4 x 6½ in. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England.

This book, now in its thirty-third year of publication, is a hand-book devoted largely to mechanical engineering subjects. New information includes a section dealing with water and hydraulic work in which data are given on the friction of water in pipes and on pumps and pump fittings. The applications of hydraulic power are described and particulars given of hydraulic accumulators, hydraulic press cylinders, flanging presses, punching presses, hydraulic pipes, flanges, etc. Another addition is a section on heating and evaporating liquids. This includes descriptions of tubular heaters, feed-water heaters, evaporators; also details of pipes and fittings. Additions have also been made to the section on compressed air and to the screw thread tables.

In addition to the hand-book section pages are devoted to a classified buyers' directory; French, Russian and Spanish buyers' directory; information on foreign money, weights and measures and post office regulations. Diary and memoranda pages for 1920 are included.

Accidents and accident prevention in machine building is discussed in Bulletin No. 256, published by the United States Bureau of Labor Statistics. The booklet gives the result of an investigation to ascertain the frequency and severity of accidents in the machine building industry and to study and analyze these accidents in such a way as to supply the information necessary for effective safety work. To this end the report seeks, as far as possible, to locate the accident hazards in particular departments and occupations, to discover the reason and causes for the occurrence of accidents and to point out some of the more successful methods for their prevention. The investigation was limited to certain selected plants representing the more important classes of product, and covered in all 194 plants. Accident rates are analyzed for the industry as a whole, by character of products, and by departments. Inability to speak English as related to accidents, safety organization, direct safeguarding methods in machine building, and machine design as a factor of safety, are among the subjects discussed.

NEW TRADE PUBLICATIONS

Axles for Motor Trucks.—Clark Equipment Co., Buchanan, Mich. Catalog. Concerned with internal gear-drive axles for motor trucks. The text is supplemented with pen etchings, photographs and drawings. The pen etchings are with colored tint.

Ship Steel.—Midvale Steel & Ordnance Co., Cambria Steel Co., Widener Building, Philadelphia. Catalog 148 pages, 4¼ x 6⅝ in. Concerned with ship steel. Gives American standard shapes for ships, sizes of steel plates, sketches of typical marine forgings, recommended practice of the United States Emergency Fleet Corporation, standard order forms, extras on structural steel; also specifications from Lloyd's Register of Shipping, American Bureau of Shipping, American Society for Testing Materials and Association of American Steel Manufacturers covering testing, boiler steel, ship steel, structural steel for ships, etc.

Thread Miller.—Smalley General Co., Bay City, Mich. Pamphlet. Gives views and production figures on thread millers in use for cutting automobile parts, flanges, valves, oil well supplies, pipe and pipe couplings, taps and dies, etc.

Pressed Safety Guards.—Benjamin Electric Mfg. Co., 806 West Washington Boulevard, Chicago. Pamphlet. Illustrations and descriptions of a punch press guard which requires that both hands of the operator be on the levers before the press can be tripped.

Heavy Duty Steam Engines.—United Engineering & Foundry Co., Pittsburgh. Bulletin N. 52 pages. Describes Tod heavy duty steam engines, built by this concern at its Youngstown works. Illustrations are given of various types of the engines and views of installations made at prominent blast furnace plants of leading steel companies are shown.

Drilling Machines.—Silver Mfg. Co., Salem, Ohio. Booklet with the title "Silver Drills in Service." A story of accomplishments of the company's 20-in. drill in use during the war in the American advance sector, told by H. D. Parker, former first lieutenant Ordnance Department.

Lift Trucks.—Cowan Truck Co., Holyoke, Mass. Booklet, 28 pages, 8½ x 11 in., with the title "Transveyor Picture Book." Illustrations show work that the company's transveyors are doing in various industries. Specifications and a reproduction of the company's guarantee are given.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per lb.
Bars:	
Refined iron, base price	5.00c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.52c. to 5.00c.
1 to 6 in. x ⅜ to 1 in.	3.52c. to 5.00c.
1 to 6 in. x ¼ to 5/16	3.62c. to 5.00c.
Rods—⅝ and 11/16	3.57c. to 4.80c.
Bands—1½ to 6 by 3/16 to No. 8	4.22c. to 6.25c.
Hoops	5.57c. to 6.25c.
Shapes:	
Beams and channels—3 to 15 in.	3.47c. to 5.00c.
Angles:	
3 in. x ¼ in. and larger	3.47c. to 5.00c.
3 in. x 3/16 in. and ⅛ in.	3.72c. to 5.35c.
1½ to 2½ in. x ⅛ in.	3.52c. to 5.65c.
1½ to 2¾ in. x 3/16 in. and thicker	3.47c. to 5.60c.
1 to 1¼ in. x 3/16 in.	3.52c. to 5.65c.
1 to 1¼ x ⅛ in.	3.57c. to 5.70c.
⅞ x ⅞ x ⅛ in.	3.62c. to 5.75c.
¾ x ⅛ in.	3.67c. to 5.80c.
⅝ x ⅛ in.	4.07c. to 6.60c.
½ x 3/32 in.	5.17c. to 7.30c.
Tees:	
1 x ⅛ in.	3.87c. to 6.00c.
1¼ in. x 1¼ x 3/16 in.	3.77c. to 5.90c.
1½ to 2½ x 3/16 in. and thicker	3.57c. to 5.70c.
3 in. and larger	3.52c. to 5.05c.

Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger	5.00c.
Toe calk, ½ x ⅜ in. and larger	5.75c. to 6.00c.
Cold-rolled strip (soft and quarter hard)	12c. to 14c.
Open-hearth spring steel	7.00c. to 10.00c.
Shafting and Screw Stock:	
Rounds	6.25c. to 7.00c.
Squares, flats and hex	6.75c. to 7.50c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c. to 24.00c.
Extra best cast steel	25.00c. to 30.00c.

Tank Plates—Steel

	Per lb.
¼ in. and heavier	3.67c. to 5.50c.

Sheets

Blue Annealed

	Per lb.
No. 10	6.62c. to 8.00c.
No. 12	6.67c. to 8.05c.
No. 14	6.72c. to 8.10c.
No. 16	7.82c. to 8.20c.

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	7.80c. to 8.80c.	
Nos. 22 and 24	7.85c. to 8.85c.	9.80c.
No. 26	7.90c. to 8.90c.	9.85c.
No. 28	8.00c. to 9.00c.	10.00c.
No. 30	8.10c. to 9.10c.	

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	8.25c. to 10.00c.
No. 16	8.50c. to 10.25c.
Nos. 18 and 20	8.65c. to 10.40c.
Nos. 22 and 24	8.80c. to 10.55c.
No. 26	8.95c. to 10.70c.
No. 27	9.10c. to 10.85c.
No. 28	9.25c. to 11.00c.
No. 30	9.75c. to 11.50c.

No. 28, 36 in. wide, 20c. higher.

Pipe

Standard—Steel	Blk.	Galv.
⅛ in. Butt	—36	—19
¼-3 in. Butt	—40	—24
3½-6 in. Lap	—35	—20
7-12 in. Lap	—25	— 8

Wrought Iron	Blk	Galv
¼-1½ in. Butt	—15	+ 5
2 in. Lap	— 7	+11
2½-6 in. Lap	— 9	+ 7
7-12 in. Lap	+ 2	+20

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per lb
Bright basic	8.00c.
Annealed soft	8.00c.
Galvanized annealed	8.50c.
Coppered basic	8.50c.
Tinned soft Bessemer	10.00c

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

Base Price	
High Brass Sheet	28¼c. to 29½c.
High Brass Wire	28¼c. to 29½c.
Brass Rod	26¾c. to 29 c.
Brass Tube	42½c. to 44½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 29½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	10.80	10.55
		90 lb...	10.90	10.65
		100 lb...	11.00	10.75
1C...$15.50	$13.25	IC...	11.25	11.00
1X... 17.75	15.25	IX...	12.25	12.00
1XX... 19.50	17.00	IXX...	13.25	13.00
1XXX... 21.25	18.75	IXXX...	14.25	14.00
1XXXX... 22.75	20.50	IXXXX...	15.25	15.00

Terne Plates

8-lb Coating 14x20

100 lb.	$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	64c.
Bar	70c. to 80c.

Copper

Lake ingot	21c. to 22c.
Electrolytic	20c. to 21c.
Casting	19½c. to 20c.

Spelter and Sheet Zinc

Western spelter	10c. to 11c.
Sheet zinc, No. 9 base, casks	14c. open 14½c.

Lead and Solder*

American pig lead	10c. to 11c.
Bar lead	11c. to 12c.
Solder ½ and ½ guaranteed	43c.
No. 1 solder	40c.
Refined solder	36c

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	90c.
Commercial grade, per lb.	50c.

Antimony

Asiatic	11¾c. to 12¼c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	35c. to 38c

Old Metals

There has been a little activity this week but not enough to change prices. Dealers' buying prices are as follows:

	Cents Per lb.
Copper, heavy and crucible	16.75
Copper, heavy and wire	16.00
Copper, light and bottoms	14.50
Brass, heavy	10.75
Brass, light	8.00
Heavy machine composition	16.00
No. 1 yellow brass turnings	9.75
No. 1 red brass or composition turnings	12.75
Lead, heavy	7.25
Lead, tea	6.00
Zinc	5.25